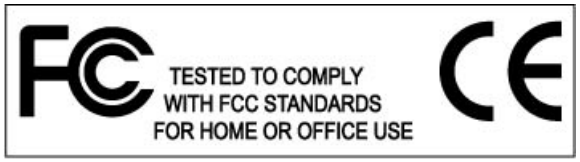
Sapphire PURE CrossFireX 890GX

Motherboard

User Manual



Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions contained in this manual, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- REORIENT OR RELOCATE THE RECEIVING ANTENNA
- INCREASE THE SEPARATION BETWEEN THE EQUIPMENT AND THE RECEIVER
- CONNECT THE EQUIPMENT INTO AN OUTLET ON A CIRCUIT DIFFERENT FROM THAT OF THE RECEIVER
- CONSULT THE DEALER OR AN EXPERIENCED AUDIO/TELEVISION TECHNICIAN

NOTE: Connecting this device to peripheral devices that do not comply with Class B requirements, or using an unshielded peripheral data cable, could also result in harmful interference to radio or television reception.

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

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Trademark:

*** Specifications and information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.**

Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.

Box Included Checklist

- ☑ Sapphire PC-AM3RS890G Motherboard
- ☑ Cable for ATA 133 IDE
- ☑ Sapphire Driver CD for Motherboard and Utilities
- ☑ Cable for Serial ATA II and Power cable
- ☑ Sappphire PC-AM3RS890G Motherboard User's Manual
- ☑ Rear External I/O Shield
- ☑ PCI-E X16 slot Switch Card

Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.

- 0 to 40 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)

- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.

- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.

- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

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Introduction

Features of motherboard

The AMD 890GX chipset motherboard series are based on the latest AMD 890GX Chipset and the SB 850 chipset which supports: Phenom™ II X 4, Phenom™ II X3 , Phenom™ II X2 processor; Athlon™ II X4; Athlon™ II X3; Athlon™ II X2 processor and Sempron AM3 CPU under 140 power consumption. With an integrated low-latency high-bandwidth DDRIII memory controller and a highly-scalable Hyper Transport technology-based system bus up to HT 3.0. AMD 890GX Platform Processor Chipset motherboard series deliver the outstanding system performance and professional desktop platform solution.

The AMD 890GX Series motherboards support new generation Socket AM3 processors with an integrated DDRIII memory controller for Dual channel DDRIII 1066 / DDRIII 1333 Module up to 16GB, also providing DDRIII 128Mb GPU side-port Memory.The motherboard supports ULTRA ATA 133 connectors and Serial ATA3 with RAID 0, 1, 5,10 and JBOD functions which support up to two IDE and six Serial ATA3 devices to accelerate hard disk drives and guarantee the data security without failure in advanced computing performance.

The AMD 890GX motherboards provide 10/100/1000 LAN function with Gigabit LAN chip which supports 10/100/1000Mbps data transfer rate. And the embedded 8-channel HD Audio CODEC is fully compatible with Sound Blaster Pro standards that offer you with the home cinema quality and satisfying software compatibility.

The AMD 890GX Series motherboards deliver outstanding value and performance for gamers, with a true bandwidth design for Multi-GPU configurations. This high bandwidth architecture in the AMD 890GX chipset is with the flexibility for single or dual card configurations. The AMD 890GX chipset provides 2 x16@8 lane PCI Express 2.0 slots to support simultaneous operation of graphics cards for astonishing performance with brilliant and intense 3D graphics.

AMD 890GX Series motherboard series offer two PCI-Express 2.0x16@ 8 lanes graphics slots. When PE4 installed switch card, the PE1 becomes PCI-Express 2.0x16@ 16 lanes graphics slot. One PCI Express x1 I/O slot tackling the most demanding multimedia tasks nowadays.The AMD 890GX motherboards also carry one 32-bit PCI slot and one mini-PCIE slot to guarantee the rich connectivity for the I/O peripheral devices. This motherboard support Hybrid CrossFireX function, the VGA Card on PE1 or PE4 will activate a Hybrid CrossFire with the onboard VGA Card, the performance will be increased 15% to 75%.

Embedded USB controllers as well as capability of expanding to 12 of USB2.0 functional ports delivering 480Mb/s bandwidth of rich connectivity, these motherboards meet the future USB demands which are also equipped with hardware monitor function on system to monitor and protect your system and maintain your non-stop business computing.

Some special features--- ***CPU Smart Fan / CPU Vcore 7-shift / OC-CON / Debug Port /3D Audio/DIY Clear/ Power on button/ Reset button*** in this motherboard are

designed for power user to use the over-clocking function in more flexible ways. But please be caution that the over-clocking maybe causes the fails in system reliabilities. This motherboard provides the guaranteed performance and meets the demands of the next generation computing. But if you insist to gain more system performance with variety possibilities of the components you choose, please be careful and make sure to read the detailed descriptions of these value added product features, please get them in the coming section.

Special Features of Motherboard

CPU Smart Fan---(The Noise Management System)

It's never been a good idea to gain the performance of your system by sacrificing its acoustics. CPU Smart Fan Noise Management System is the answer to control the noise level needed for now-a-day's high performance computing system. The system will automatically increase the fan speed when CPU operating loading is high, after the CPU is in normal operating condition, the system will low down the fan speed for the silent operating environment. The system can provide the much longer life cycle for both CPU and the system fans for game use and business requirements.

CPU Vcore 7-Shift--- (Shift to Higher Performance)

The CPU voltage can be adjusted up by 7 steps for the precisely over-clocking of extra demanding computing performance.

OC-CON ---（High-polymer Solid Electrolysis Aluminum Capacitors）

The working temperature is from 55 degrees Centigrade below zero to 125 degrees Centigrade, OC-CON capacitors possess superior physical characteristics that can be while reducing the working temperature between 20 degrees Centigrade each time, intact extension 10 times of effective product operation lives, at not rising degrees Centigrade of working temperatures each time a relative one, life of product decline 10% only too.

Debug Port --- **(The Professional Hardware Diagnosis System)**

Being bugged of abnormal system failure through the tossed and turned nights no more, the embedded Hardware Debug Port offers you the real-time visual system healthy for the demanding usage of computing. No more bugging by unknown system failure and no more time wasted in the first moment of 24-hour nonstop ping business computing, the embedded Debug Port will turn you into a well training hardware professional with the seeing system situation. (The Post Code please refer to appendix)

3D Audio—(3D Audio Sound Effect)

OP with two-stage Butterworth filter and quadruple noninverting amplifier enhances bass effect under the 100MHz range to perfect audio effect, brings you stunning shock experience in video game, true-to-life simulated feeling when watching films and the greatest touch as that in the concert. There is a 3D Audio button integrated on the board. Press down the button to enable 3D audio effect or press again to disabled it.

DIY Clear-The CMOS button is to facilitate the clear CMOS process for power user overclocking function. The user can easily clear or restore CMOS setting by pressing the button without tacking trouble to remove the case and locate the jumper for clear CMOS .

Power On Button- You can easily start the computer by pressing down this button for a few seconds, without troubling yourself to locate the front panel jumpers to find the Power on jumper.

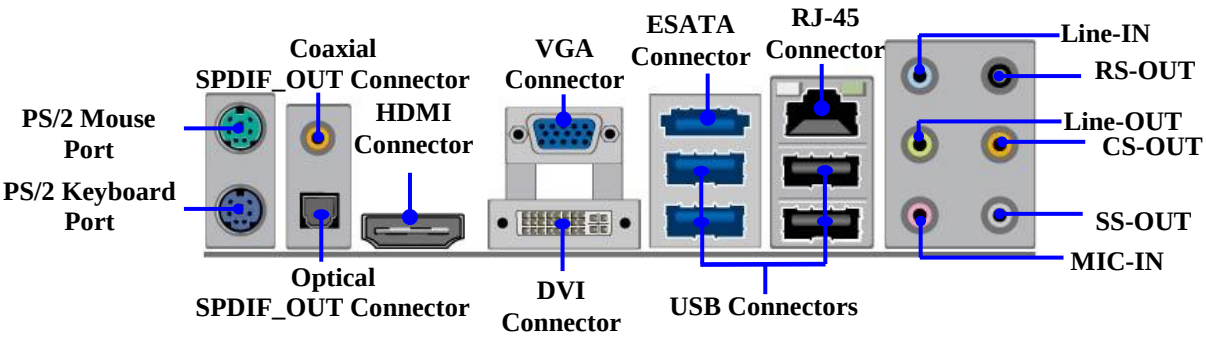
Reset Button..: You can easily restart the computer by pressing down this button for a few seconds, without troubling yourself to locate the front panel jumpers to find the reset jumper.

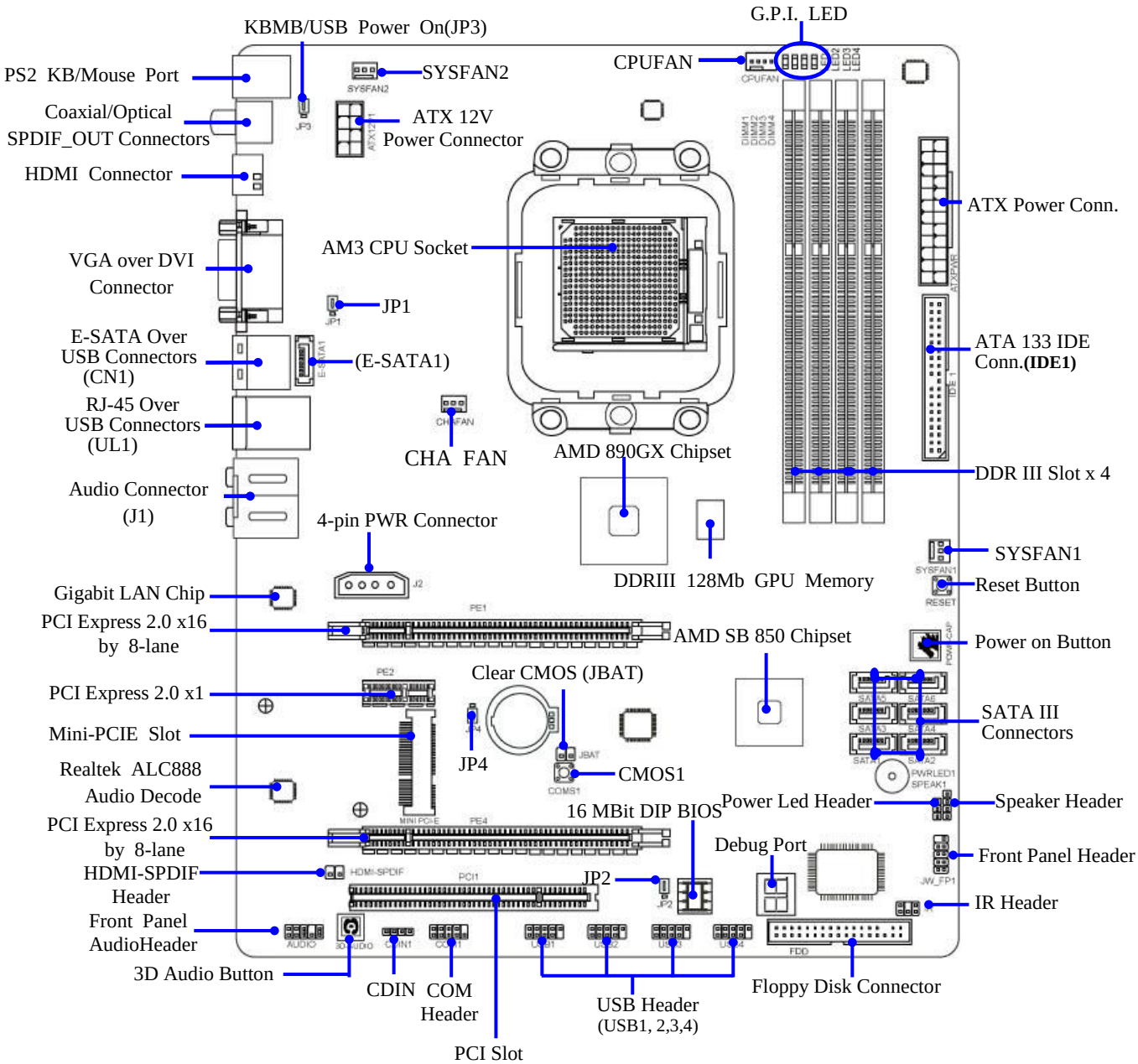
Specification

Spec	Description
Design	● ATX form factor 4 layers PCB size: 30.5cm x24.5cm
Chipset	● AMD 890GX North Bridge Chipset ● AMD SB 850 South Bridge Chipset
CPU Socket AM3	● Support AMD AM3 CPU : Phenom™ II X 4, Phenom™ II X3 , Phenom™ II X2 processor; Athlon™ II X4; Athlon™ II X3; Athlon™ II X2 processor and Sempron AM3 CPU ● Power consumptionsupport to 140 W CPU ● Support HT 3.0
Memory Slot	● 240-pin DDRIII Module slot x 4 ● Support 4pcs DDRIII 1066 /DDRIII 1333 Modules Expandable to 8GB ● Dual channel supported
Expansion Slot	● 2pcs PCI-Express 2.0x16 by 8 lane ● 1pcs PCI-Express 2.0 x1 slot ● 1pcs 32-bit PCI slot ● 1pcs of mini-PCIE slot
Integrate IDE and Serial ATA2 RAID	● JMC chip support one IDE HD connector that deliver the data transfer rate up to 133 MB/s for 2 IDE Devices ● SB 850 supports 6 Serial ATAIII 6 Gb/s connectors with RAID 0, 1, 10,5 and JBOD function
Gigabit LAN	● Integrated Gigabit LAN chip. ● Support Fast Ethernet LAN function of providing 10Mb/100Mb/1000 Mb/s data transfer rate
8 CH-Audio	● Realtek Azalia 8-channel Audio Codec integrated ● Support 8-channel 3D surround & Positioning Audio ● Audio driver and utility included
Sideport Memory	● Embedded DDR III 128Mb sideport memory
BIOS	● AMI 16MB DIP Flash ROM
Multi I/O	● PS/2 keyboard and PS/2 mouse connectors ● Coaxial /Optical SPDIF_OUT connectors ● HDMI connector / DVI connector / VGA connector ● ESATA connector x1 ● RJ-45 connector x1 ● USB2.0 port x 4 and headers x 4 ● Audio connector x1 (8CH Audio) ● Floppy disk drive connector x1 /Hard Disk Drive Connector x1 ● Serial port header x1 ● HDMI-SPDIF header x1 ● IR header x1

Layout Diagram

Rear I / O for HA09





Jumpers

Jumper	Name	Description
JP1/JP2	USB Power On Enabled/Disabled	3-pin Block
JP3	KB/USB Power On Enabled/Disabled	3-pin Block
JBAT	Clear CMOS Header	2-pin Block

Connectors

Connector	Name	Description
ATXPWR1	ATX Power Connector	24-pin Block
ATX12V	ATX 12V Power Connector	8-pin Block
J3	Power Connector	4-Pin Block
KB	PS/2 Mouse & PS/2 Keyboard Connector	6-pin Female
SPDIF_OUT1 /SPDIF_OUT2	Coaxial/Optical SPDIF_OUT Connector	1-phone Jack
USB from CN1, UL1	USB2.0 Port Connector	4-pin Connector
ESATA from CN1	External SATA III Connector	7-pin Connector
RJ-45LAN from UL1	Gigabit LAN Port Connector	8-pin Connector
J1	8-CH HD Audio Connector	6- phone jack Conn.
FDD	Floppy Driver Connector	34-pin Block
IDE	Primary IDE Connector	40-pin Block
SATA1~SATA6, E-SATA1	Serial ATAIII Connectors	7-pin Connector
CN1 for ESATA	External Serial ATAIII Connector	7-pin Connector
VGA1	D-Sub Connector	15-pin Connector
DVI	Digital Visual Interface	29-pin Connector
HDMI	High-Definition Multimedia	19-pin Connector

Headers

Header	Name	Description
AUDIO1	Front Panel SPEAKER, MIC header	9-pin Block
USB1, USB2,USB3,USB4	USB Port Headers	9-pin Block
SPEAK	PC Speaker connector	4-pin Block
PWR LED1	Power LED	3-pin Block
JW_FP1 (HD LED/PWR LED/ Reset/ Power Button)	Front Panel Header	9-pin Block
SYSFAN1/2, CHAFAN	FAN Headers	3-pin Block
CPUFAN	FAN Header	4-pin Block
CDIN1	CD Audio-In Header	4-pin Block
IR	IR infrared module Headers	5-pin Block
COM1	Serial Port COM1 Header	9-pin Block
HDMI-SPDIF	SPDIF Out header	2-pin Block

Expansion Sockets

Socket/Slot	Name	Description
ZIF Socket AM3	CPU Socket	938-pin PGAB CPU Socket
DIMM1~4	DDRIII Module Socket	240-pin DDRIII Module Socket
PCI1	PCI Slots	32-bit PCI Local Bus Expansion slots
PE2	PCI-Express 2.0 x1Slot	PCI-Express 2.0 x1 Expansion Slots
PE1,PE4	PCI-Express 2.0x16 Slot	PCI-Express 2.0x16 Expansion Slots
MINIPCIEB1	Mini-PCIE Slot	Mini-PCIE Expansion Slot

Hardware Installation

WARNING!	Turn off your power when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards.

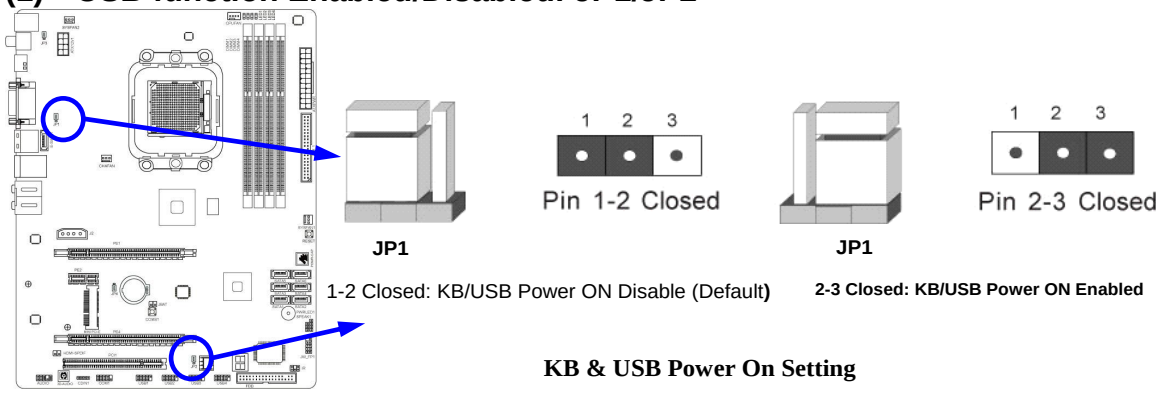
Hardware installation Steps

Before using your computer, you had better complete the following steps:

1. Check motherboard jumper setting
2. Install CPU and Fan
3. Install System Memory (DIMM)
4. Install Expansion cards
5. Connect IDE and Front Panel /Back Panel cable
6. Connect ATX Power cable
7. Power-On and Load Standard Default
8. Reboot
9. Install Operating System
10. Install Driver and Utility

Checking Motherboard's Jumper Setting

(1) USB function Enabled/Disabled: JP1/JP2

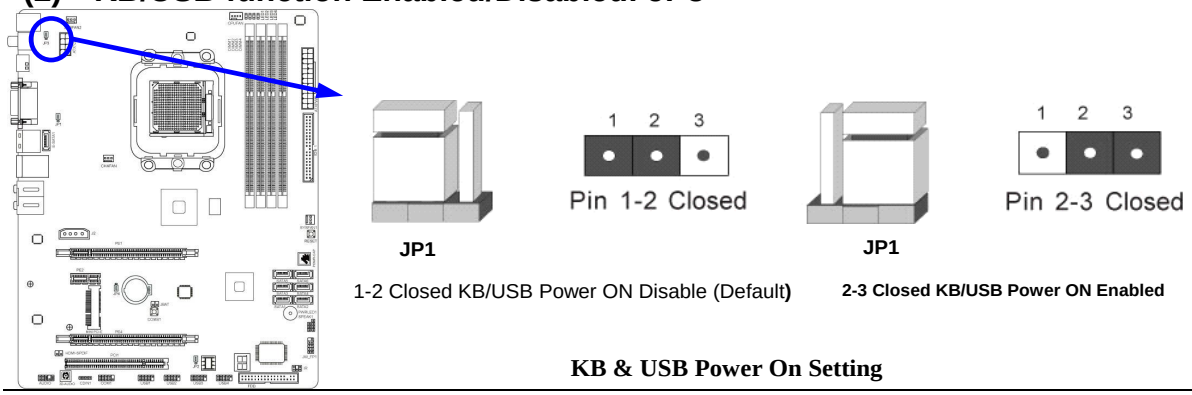


JP1 1-2 Closed: KB/USB Power ON Disable (Default)

JP1 **2-3 Closed: KB/USB Power ON Enabled**

KB & USB Power On Setting

(2) KB/USB function Enabled/Disabled: JP3



JP1 1-2 Closed KB/USB Power ON Disable (Default)

JP1 **2-3 Closed KB/USB Power ON Enabled**

KB & USB Power On Setting

(3) CMOS RAM Clear (2-pin): JBAT

A battery must be used to retain the motherboard configuration in CMOS RAM short 1-2 pins of JBAT to clear the CMOS data.

WARNNING：Please remove or turn off the power supply before CMOS clear!

To clear the CMOS, follow the procedure below:

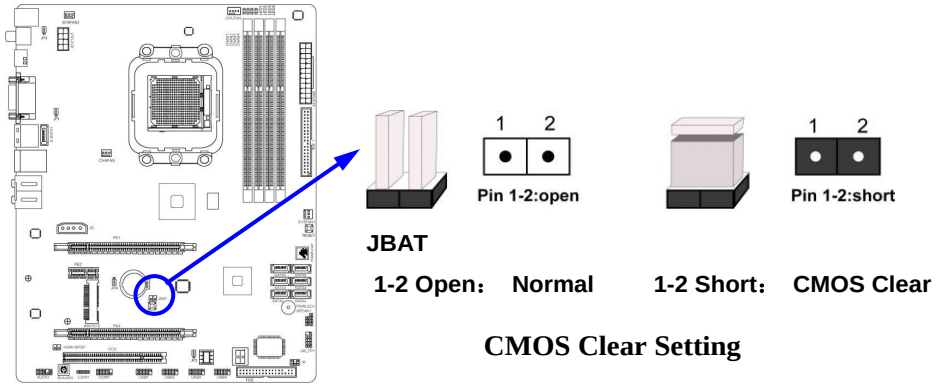
1. Turn off the system and unplug the AC power
2. Remove ATX power cable from ATX power connector
3. Locate JBAT and short pins 1-2 for a few seconds, if shorted with the jump cap, short for a few seconds then pull out the hat.
4. Connect ATX power cable back to ATX power connector

Note: When should clear CMOS

1. Troubleshooting

2. Forget password

3. After over clocking system boot fail



CMOS Clear Setting

Install CPU

About AMD AM3 CPU Installation

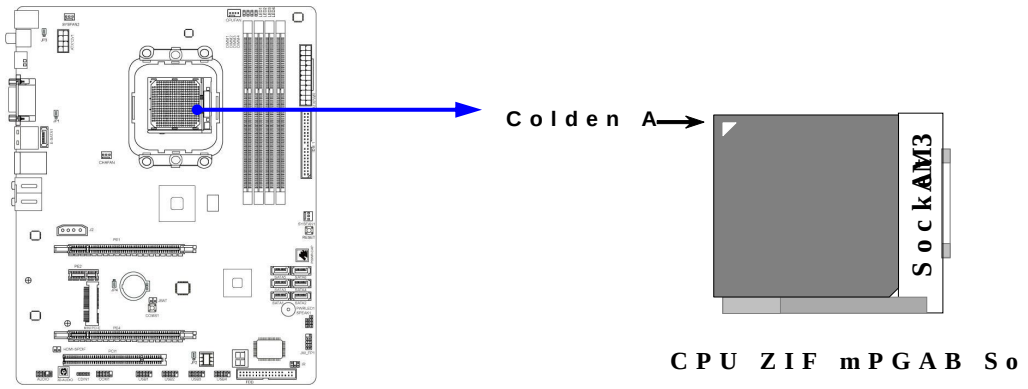
This motherboard provides a socket AM3 surface mount, Zero Insertion Force (ZIF) socket, referred to as the mPGA socket supports AMD AM3 processor.

The CPU that comes with the motherboard should have a cooling FAN attached to prevent overheating. If this is not the case, then purchase a correct cooling FAN before you turn on your system.

WARNING! Be sure that there is sufficient air circulation across the processor's heatsink and CPU cooling FAN is working correctly, otherwise it may cause the processor and motherboard overheat and damage, you may install an auxiliary cooling FAN, if necessary.

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the level sideways away from the socket then upward to a 90-degree angle. Insert the CPU with the correct orientation as shown

below. The notched corner should point toward the end of the level. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown.



When you put the CPU into the ZIF socket, No force required to insert of the CPU, and then press the level to locate position slightly without any extra force.

AMD AM3 Processor Family

Cooling Solutions

As processor technology pushes to faster speeds and higher performance with increasing operation clock, thermal management becomes increasingly crucial while building computer systems. Maintaining the proper computing environment without thermal increasing is the key to reliable, stable, and 24 hours system operation. The overall goal is keeping the processor below its specified maximum case temperature. Heatsinks induce improved processor heat dissipation through increasing surface area and concentrated airflow from attached active cooling fans. In addition, interface materials allow effective transfers of heat from the processor to the heatsink. For optimum heat transfer, AMD recommends the use of thermal grease and mounting clips to attach the heatsink to the processor.

Please refer to the website below for collection of heatsinks evaluated and recommended for Socket AM3 processors by AMD. In addition, this collection is not intended to be a comprehensive listing of all heatsinks that support Socket-AM3 processors.

Install Memory

This motherboard provides four 240-pin DDR III DUAL INLINE MEMORY MODULES (DIMM) socket for DDR III memory expansion available to maximum memory volume of 8GB DDRIII SDRAM.

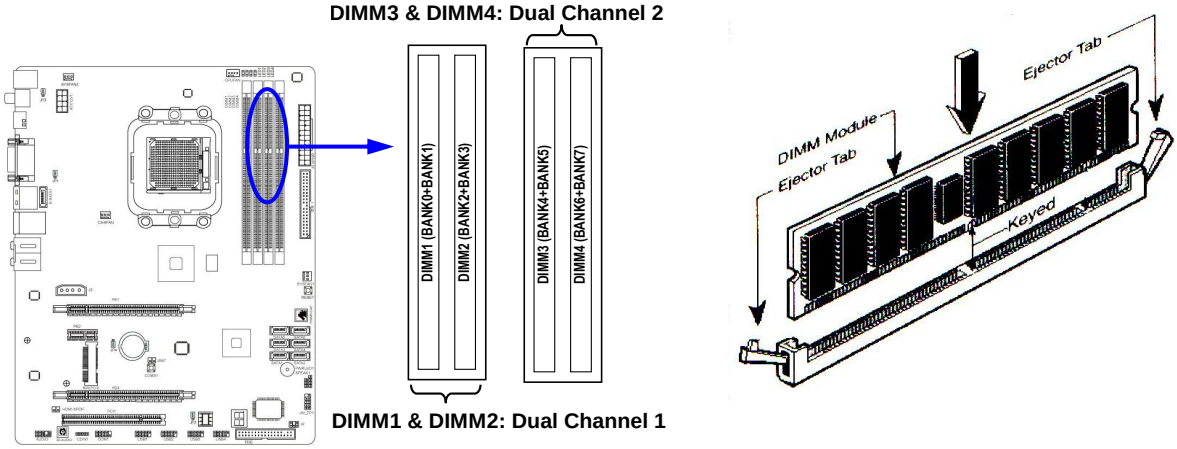
Valid Memory Configurations

Bank	240-Pin DIMM	PCS	Maximum Capacity
Bank 0, 1 (DIMM1)	DDR III 1066/ DDR III1333	X1	2GB
Bank 2, 3 (DIMM2)	DDR III 1066/ DDR III1333	X1	2GB
Bank 4, 5 (DIMM3)	DDR III 1066/ DDR III1333	X1	2GB
Bank 6, 7 (DIMM4)	DDR III 1066/ DDR III1333	X1	2GB
Total	System Memory (Max4GB)	4	16GB

Dual channel Limited!

1. Dual channel function only supports when 2 DIMM Modules plug in either both DIMM1 & DIMM2, or four DIMM Modules please plug in DIMM1~DIMM4.
2. Memory modules must be the same type, same size, same frequency for dual channel function.

Install DDR SDRAM modules to your motherboard is not difficult, you can refer to figure below to see how to install a 240-Pin DDRIII 1066/DDRIII 1333 SDRAM module.



Graph 2-4

NOTE!	When you install DIMM module fully into the DIMM socket the eject tab should be locked into the DIMM module very firmly and fit into its indention on both sides.

Expansion Cards

WARNING! Turn off your power when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards.

Procedure for Expansion Card Installation

1. Read the documentation for your expansion card and make any necessary hardware or software setting for your expansion card such as jumpers.
2. Remove your computer's cover and the bracket plate on the slot you intend to use.
3. Align the card's connectors and press firmly.
4. Secure the card on the slot with the screen you remove above.
5. Replace the computer system's cover.
6. Set up the BIOS if necessary.
7. Install the necessary software driver for your expansion card.

Assigning IRQs for Expansion Card

Some expansion cards need an IRQ to operate. Generally, an IRQ must exclusively assign to one use. In a standard design, there are 16 IRQs available but most of them are already in use.

Standard Interrupt Assignments

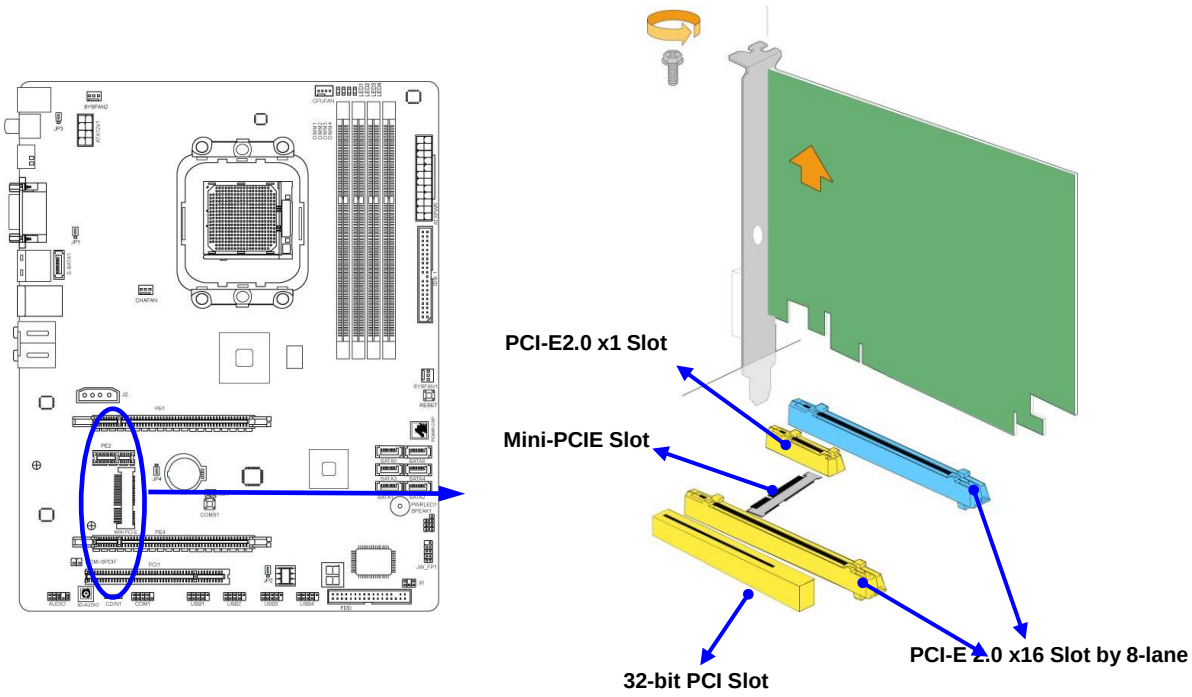
IRQ	Priority	Standard function
0	N/A	System Timer
1	N/A	Keyboard Controller
2	N/A	Programmable Interrupt
3 *	8	Communications Port (COM2)
4 *	9	Communications Port (COM1)
5 *	6	Sound Card (sometimes LPT2)
6 *	11	Floppy Disk Controller
7 *	7	Printer Port (LPT1)
8	N/A	System CMOS/Real Time Clock
9 *	10	ACPI Mode when enabled
10 *	3	IRQ Holder for PCI Steering
11 *	2	IRQ Holder for PCI Steering
12 *	4	PS/2 Compatible Mouse Port
13	N/A	Numeric Data Processor
14 *	5	Primary IDE Channel
15 *	1	Secondary IDE Channel

* These IRQs are usually available for ISA or PCI devices.

NOTE!	If using PCI cards on shared slots, make sure that the drivers support “Shared IRQ” or that the cards don’t need IRQ assignments. Conflicts will arise between the two PCI groups that will make the system unstable or cards inoperable.

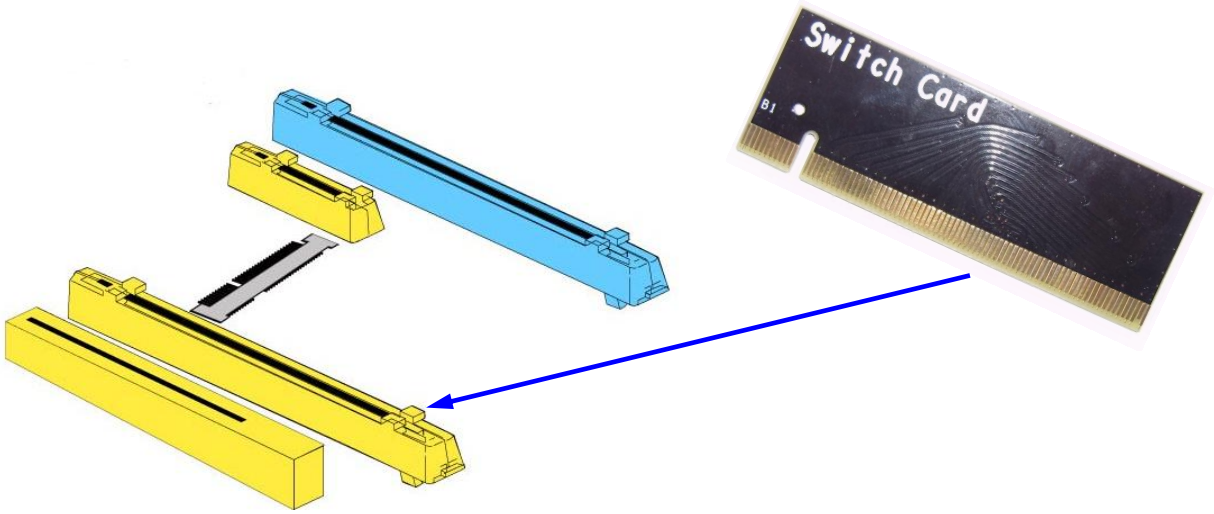
PCI Express2.0 Slots

AMD 890GX Series motherboard series offer two PCI-Express 2.0x1 6@ 8 lanes graphics slots. When PE4 installed switch card, the PE1 will doubled its bandwidth. One PCI Express x1 I/O slot tackling the most demanding multimedia tasks nowadays. The AMD 890GX motherboards also carry one 32-bit PCI slot and one mini-PCIE slot to guarantee the rich connectivity for the I/O peripheral devices.



PCI Express Switch Card

Install PCI-E Switch Card to PCI-Express2.0 x16 graphics slot can double PCI-E X16 VGA card installed transfer rate up to 16 lane; 16Gbyte/sec. Please be noted that Switch Card must plug in PE4



Connectors and Headers

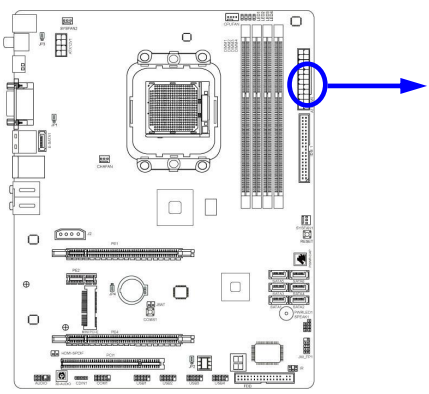
Connectors

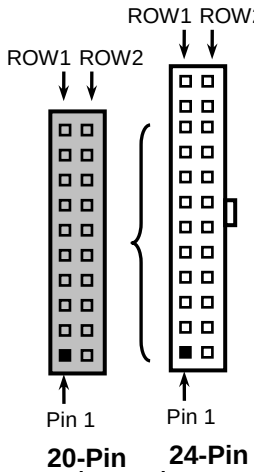
(1) Power Connector (24-pin block) : ATXPWR1

ATX Power Supply connector: This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows using soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

** We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.

** If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.





PIN	ROW1	ROW2
1	3.3V	3.3V
2	3.3V	-12V
3	GND	GND
4	5V	Soft Power On
5	GND	GND
6	5V	GND
7	GND	GND
8	Power OK	-5V
9	+5V (for Soft Logic)	+5V
10	+12V	+5V
11	+12V	+5V
12	+3V	GND

** If you are using a 20-pin power plug, please refer to Figure1 for power supply connection. Power plug form power supply and power connectors from motherboard both adopt key design to avoid mistake installation. You can insert the power plug into the connector with ease only in the right direction. If the

direction is wrong it is hard to fit in and if you make the connection by force if is possible.

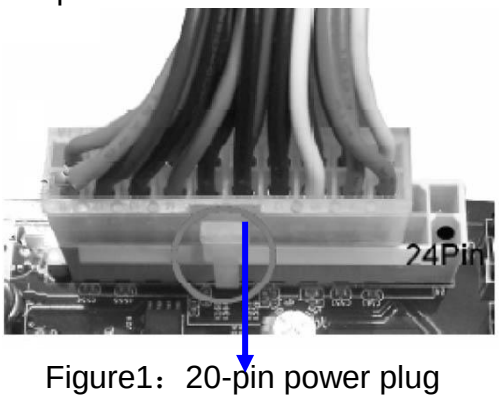


Figure1：20-pin power plug

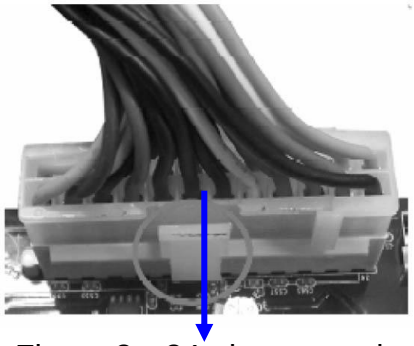
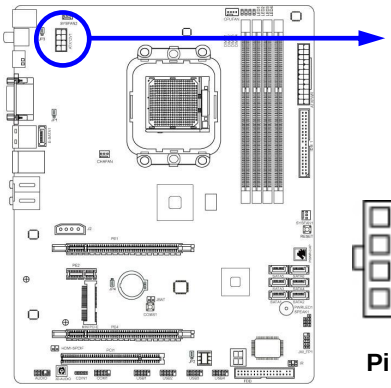
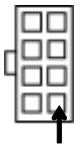


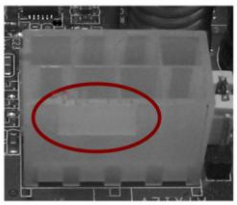
Figure 2：24-pin power plug

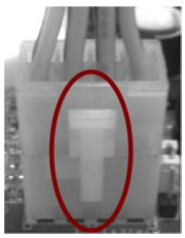
(2)ATX 12V Power Connector (8-pin block) : ATX12V1

This is a new defined 8-pins connector that usually comes with ATX Power Supply. The ATX Power Supply which fully supports Socket AM3 processor must including this connector for support extra 12V voltage to maintain system power consumption. Without this connector will cause system unboot because the power supply can not provide sufficient current for system.









(3) PS/2 Mouse & PS/2 Keyboard Connector: KB

The connectors are for PS/2 keyboard and PS/2 Mouse.

(4) USB Port connector: CN1/ UL1 for USB

The connectors are 4-pin connector that connects USB devices to the system board.

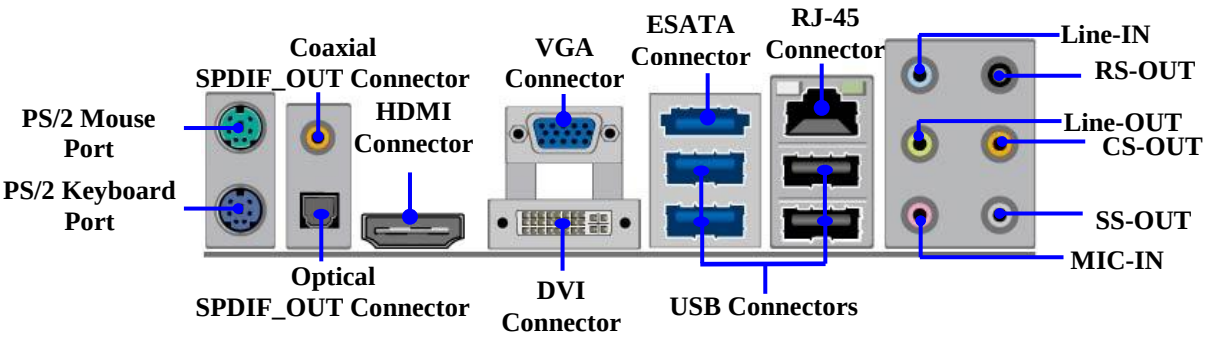
(5) LAN Port connector: UL1 for RJ45 LAN

The connector is standard RJ45 connector for Network. It supports 10M/100Mb/1000Mb s data transfer rate

(6) Audio Line-In, Lin-Out, MIC, RS-Out, CS-Out，SS-Out connector : J1

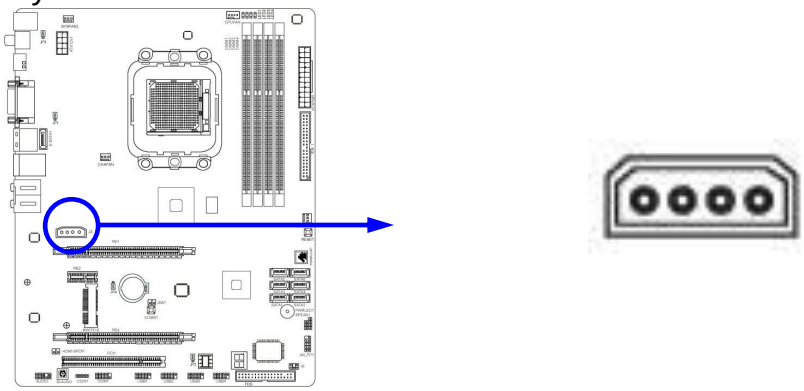
These Connectors are 6 Phone-Jack for LINE-OUT, LINE-IN, MIC, RS-Out, CS-Out，SS-Out audio connections.

Line-in : (BLUE)	Audio input to sound chip
Line-out : (GREEN)	Audio output to speaker
MIC : (PINK)	Microphone Connector
RS-OUT : (BLACK)	Rear-Surround audio output
CS-OUT : (ORANGE)	Center/ Subwoofer audio output
SS-OUT: (GRAY)	Side-Surround audio output



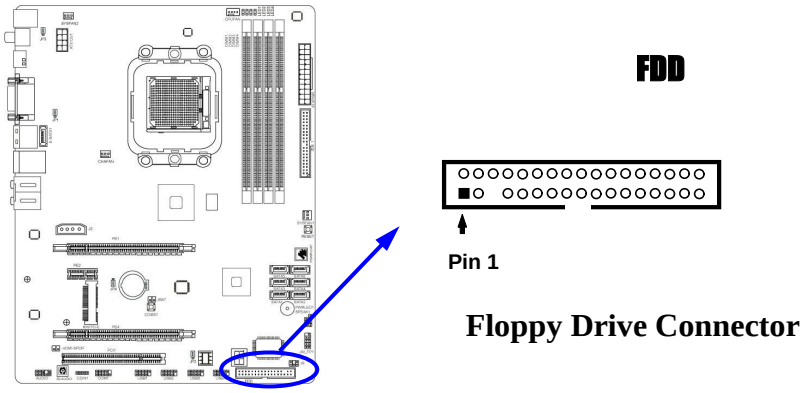
(7) Large 4-Pin Power Connector ： J2 Power Connector

The connectors are 4-pin connector that supports extra 12V / 5V power to your system



(8)Floppy drive Connector (34-pin block): FDD

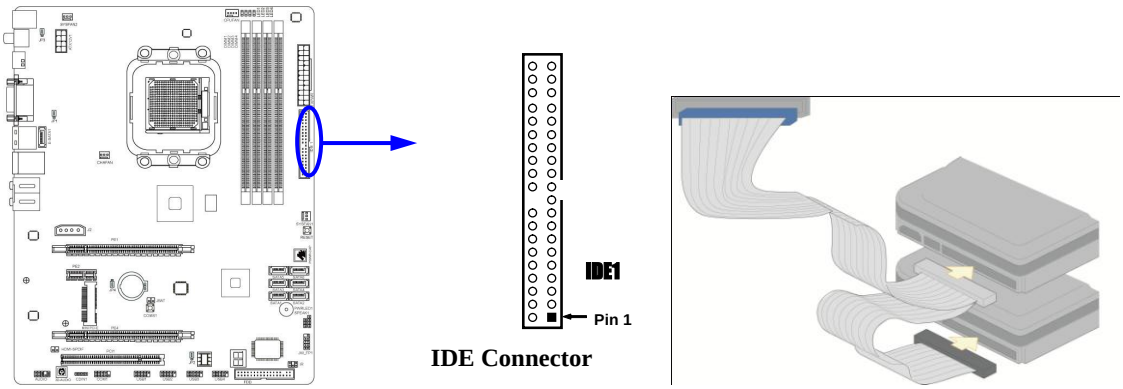
This connector supports the provided floppy drive ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to the floppy drives.



Floppy Drive Connector

(9) Primary IDE Connector (40-pin block): IDE1

This connector supports the provided IDE hard disk ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to your hard disk(s). If you install two hard disks, you must configure the second drive to Slave mode by setting its jumpers accordingly. Please refer to the documentation of your hard disk for the jumper settings.

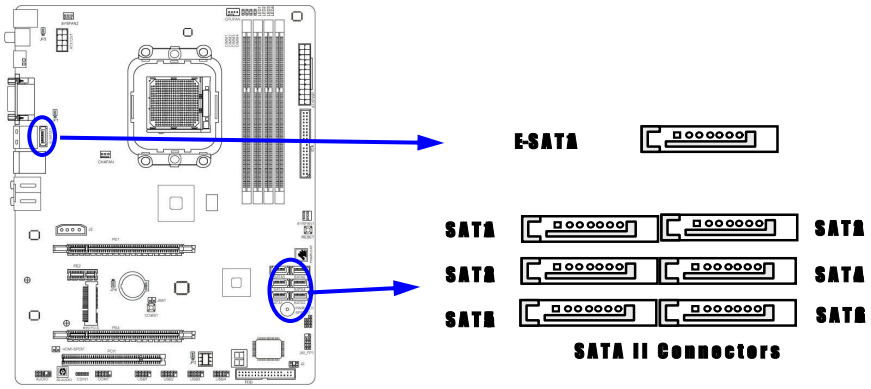


IDE Connector

- Two hard disks can be connected to each connector. The first HDD is referred to as the “Master” and the second HDD is referred to as the “Slave”.
- For performance issues, we strongly suggest you don’t install a CD-ROM or DVD-ROM drive on the same IDE channel as a hard disk. Otherwise, the system performance on this channel may drop.

(10) Serial-ATAIII Port connector:SATA1~SATA6; E-SATA1

This connector supports the provided SATA III hard disk cable to connecting the motherboard with serial ATAIII hard disk. E-SATA1 is not for SATA harddrive ,it is only for connecting t one of the SATA device from SATA1~SATA6 to activate the ESATA connector.



(11) ESATA Port: CN1 for ESATA

This connector supports the External Serial ATA2 (ESATA) enable the full SATA interface speed outside the chassis, up to 6Gb/s. The ESATA port can be enabled only when the E-SATA 1 is connected to one of SATA 1~SATA6.

(12) D-Sub 15-pin Connector: VGA1

VGA is the 15-pin D-Subminiature female connector; it is for the display devices, such as the CRT monitor, LCD monitor and so on.

(13) Digital Visual Interface: DVI

This interface standard designed to maximize the visual quality of digital display devices such as flat panel LCD computer displays and digital projectors.

(14) High-Definition Multimedia Interface: HDMI

This point-to-point interface is for audio and video signals designed as a single-cable solution for home theater and consumer electronics equipment.

NOTE!	DVI and HDMI Connector can not be used at the same time.

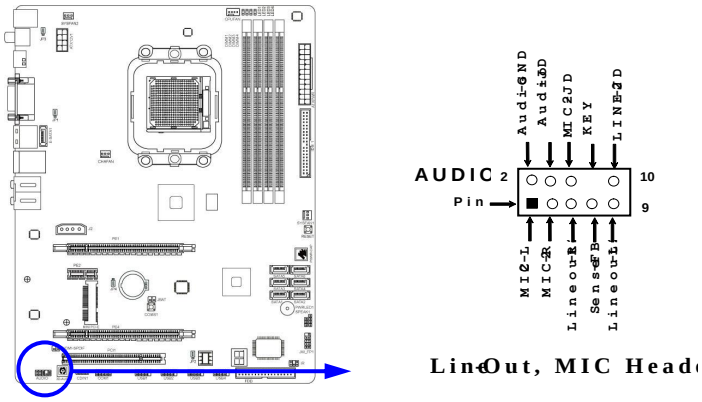
(15) Coaxial/Optical SPDIF _OUT header: SPDIF_OUT1/SPDIF_OUT2

The SPDIF output is capable of providing digital audio to external speakers or compressed AC3 data to an external Dolby digital decoder. Use this feature only when your stereo system has digital input function. SPDIF_OUT1(above) is coaxial SPDIF_OUT connector while SPDIF_OUT2(below) is optical SPDIF_OUT connector.

Headers

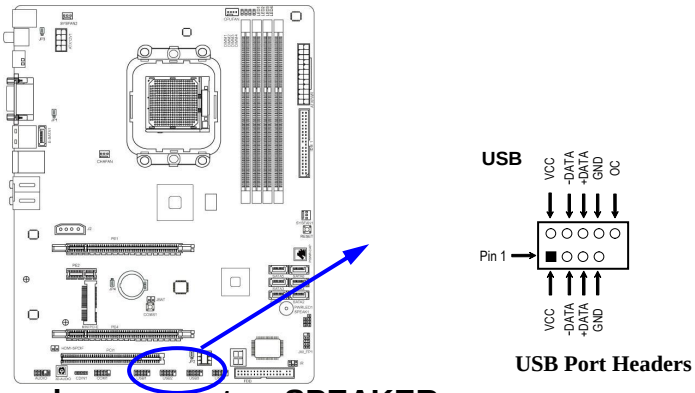
(1) Line-Out/MIC Header for Front Panel (9-pin): AUDIO1

These headers connect to Front Panel Line-out, MIC connector with cable.



(2)USB Port Headers (9-pin): USB1/USB2/USB3/USB4

These headers are used for connecting the additional USB port plug. By attaching an option USB cable, your can be provided with two additional USB plugs affixed to the back panel.



USB Port Headers

(3)Speaker connector: SPEAKER

This 4-pin connector connects to the case-mounted speaker. See the figure below.

(4) Power LED: PWR LED

The Power LED is light on while the system power is on. Connect the Power LED from the system case to this pin.

(5) Hard disk Activity LED: HD LED

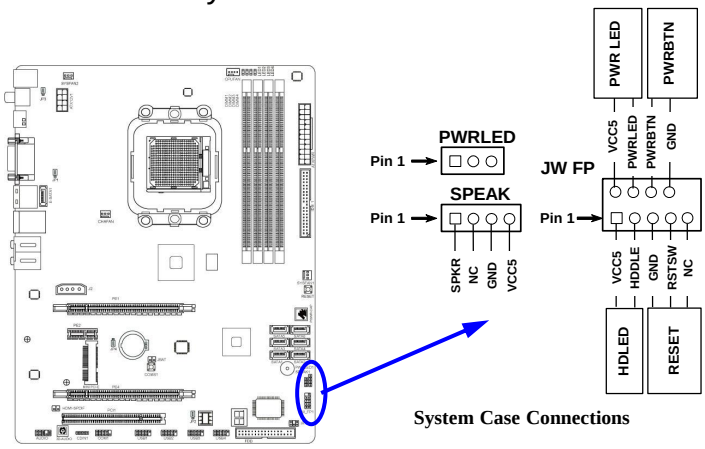
This connector connects to the hard disk activity indicator light on the case.

(6) Reset switch lead: RESET

This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting in order to prolong the lift of the system's power supply. See the figure below.

(7)Power switch: PWR BTN

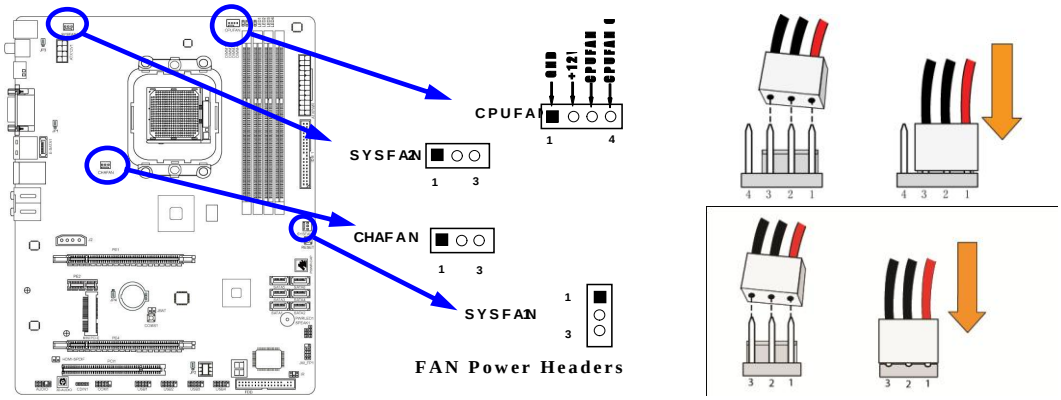
This 2-pin connector connects to the case-mounted power switch to power ON/OFF the system.



System Case Connections

(8)FAN Power Headers: SYSFAN1, SYSFAN2, CHAFAN (3-pin), CPUFAN (4-pin)

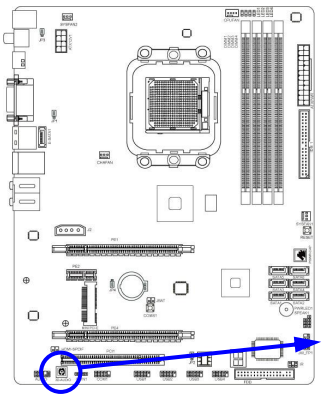
These connectors support cooling fans of 350mA (4.2 Watts) or less, depending on the fan manufacturer, the wire and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of connector.

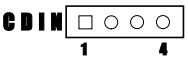


FAN Power Headers

(9) CD Audio-In Headers (4-pin): CDIN1

CDIN are the connectors for CD-Audio Input signal. Please connect it to CD-ROM CD-Audio output connector.

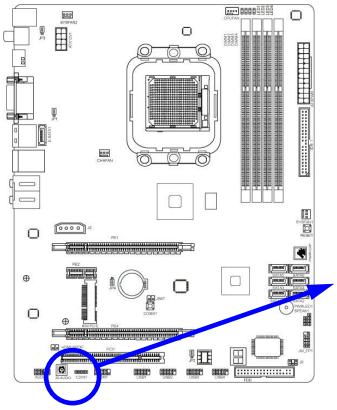


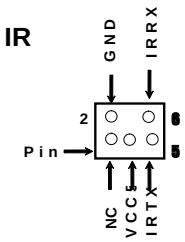


CD Audio In Headers

(10) IR infrared module Headers (5-pin): IR

This connector supports the optional wireless transmitting and receiving infrared module. You must configure the setting through the BIOS setup to use the IR function.

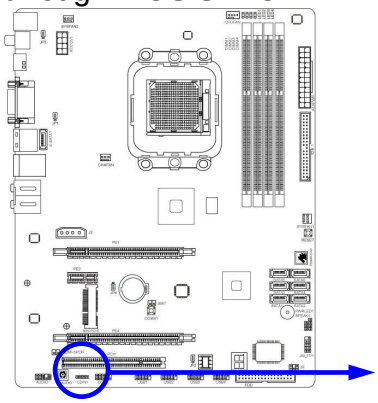


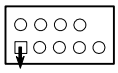


IR infrared module H

(11) Serial COM Port header: COM1

COM1 is the 9-pin block pin-header. The On-board serial port can be disabled through BIOS SETUP.



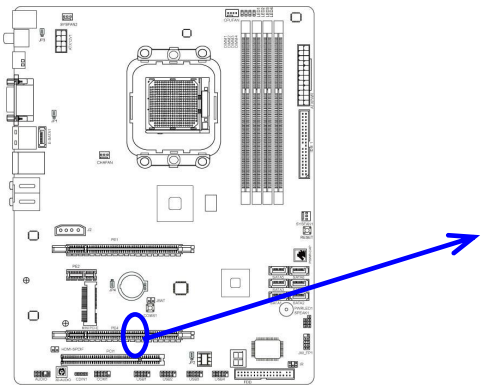


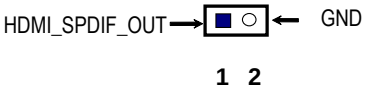
Pin

Serial COM Port Bloc

(12) HDMI-SPDIF Out header: HDMI_SPDIF

The SPDIF output is capable of providing digital audio to external speakers or compressed AC3 data to an external Dolby digital decoder. Use this feature only when your stereo system has digital input function. Some of the VGA Card need connect SPDIF-IN Connector，so its HDMI Port can make sounds .





HDMI_SPDIF Header

Starting Up Your Computer

1. After all connections are made, close your computer case cover.
2. Be sure all the switch are off, and check that the power supply input voltage is set to proper position, usually in-put voltage is 220V~240V or 110V~120V depending on your country's voltage used.
3. Connect the power supply cord into the power supply located on the back of your system case according to your system user's manual.
4. Turn on your peripheral as following order:
   a. Your monitor.
   b. Other external peripheral (Printer, Scanner, External Modem etc…)
   c. Your system power. For ATX power supplies, you need to turn on the power supply and press the ATX power switch on the front side of the case.
5. The power LED on the front panel of the system case will light. The LED on the monitor may light up or switch between orange and green after the system is on. If it complies with green standards or if it is has a power standby feature. The system will then run power-on test. While the test is running, the BIOS will alarm beeps or additional message will appear on the screen.

   If you do not see any thing within 30 seconds from the time you turn on the power. The system may have failed on power-on test. Recheck your jumper settings and connections or call your retailer for assistance.

6. During power-on, press <Delete> key to enter BIOS setup. Follow the instructions in BIOS SETUP.
7. **Power off your computer:** You must first exit or shut down your operating system before switch off the power switch. For ATX power supply, you can press ATX power switching after exiting or shutting down your operating system. If you use Windows 9X, click **"Start"** button, click **"Shut down"** and then click **"Shut down the computer?"** The power supply should turn off after windows shut down.

Useful Setup

BIOS Setup

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

In the BIOS Setup main menu of Figure 3-1, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press <Esc> to quit the BIOS Setup.
- Press ↑↓←→ (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.
- Press <F10> when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.
- Press <+>/<–> keys when you want to modify the BIOS parameters for the active option.
- Press Home to go to the top of screen; press End to go to the bottom of screen.

- Press Enter to go to sub screen.

Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press <Del> to enter Setup

Getting Help

Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Status Page Setup Menu/Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

The Main Menu

Once you enter AMI BIOS Setup Utility, the Main Menu (Figure 3-1) will appear on the screen. The Main Menu allows you to select from 12 setup functions and 2 exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

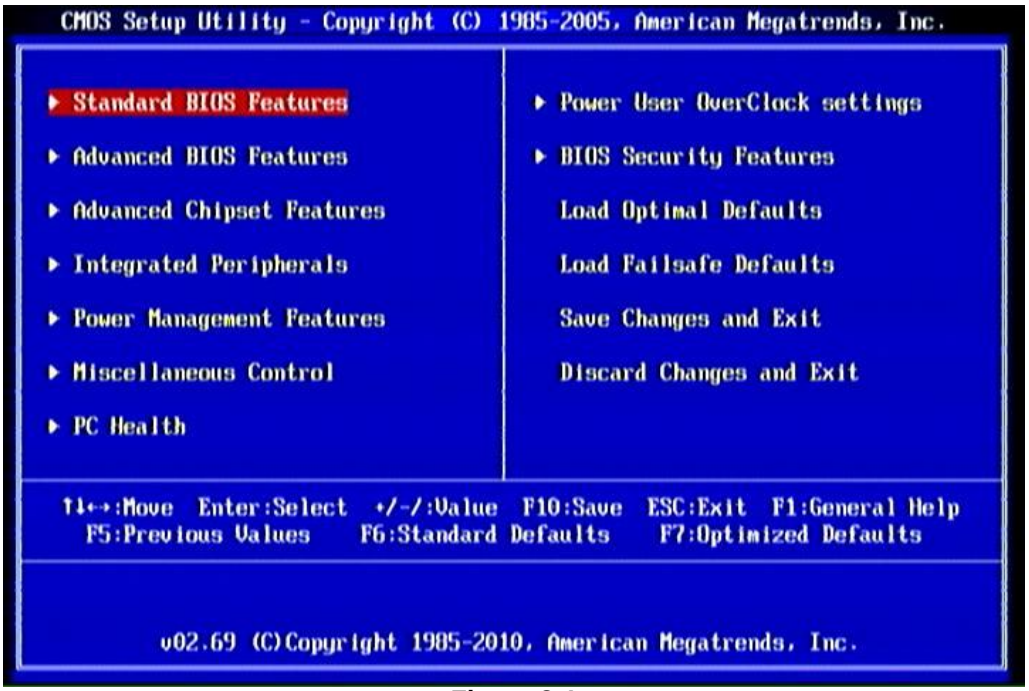

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Standard BIOS Features
Advanced BIOS Features
Advanced Chipset Features
Integrated Peripherals
Power Management Features
Miscellaneous Control
PC Health
Power User OverClock settings
BIOS Security Features
Load Optimal Defaults
Load Failsafe Defaults
Save Changes and Exit
Discard Changes and Exit
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults
v02.69 (C)Copyright 1985-2010, American Megatrends, Inc.

Figure 3-1

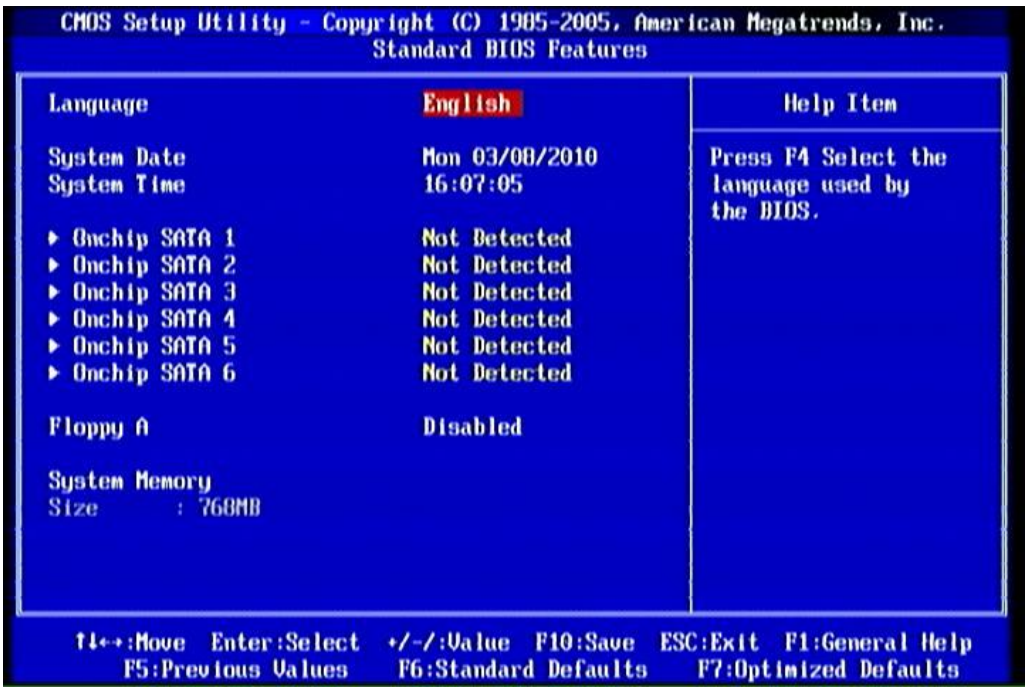
Standard BIOS Features

Use this Menu for basic system configurations.

Advanced BIOS Features
Use this menu to set the Advanced Features available on your system.
Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.
Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.
Power Management Features
Use this menu to specify your settings for power management.
Miscellaneous Control
Use this menu to specify your settings for Miscellaneous Control.
PC Health
This entry shows your PC health status.
Power User Overclock Settings
Use this menu to specify your settings (frequency, Voltage) for overclocking demand.
Load Failsafe Defaults
This menu uses a minimal performance setting, but the system would run in a stable way.
Load Optimal Defaults
Use this menu to load the BIOS default values these are setting for optimal performances system operations for performance use.
BIOS Security
This entry for setting Supervisor password and User password
Save Changes and Exit
Save CMOS value changes to CMOS and exit setup.
Discard Changes and Exit
Abandon all CMOS value changes and exit setup.

Standard BIOS Features

The items in Standard CMOS Setup Menu are divided into several categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.



Language
Use this item to select the current default language used in BIOS. The Optional settings are: Chinese (GB): English.

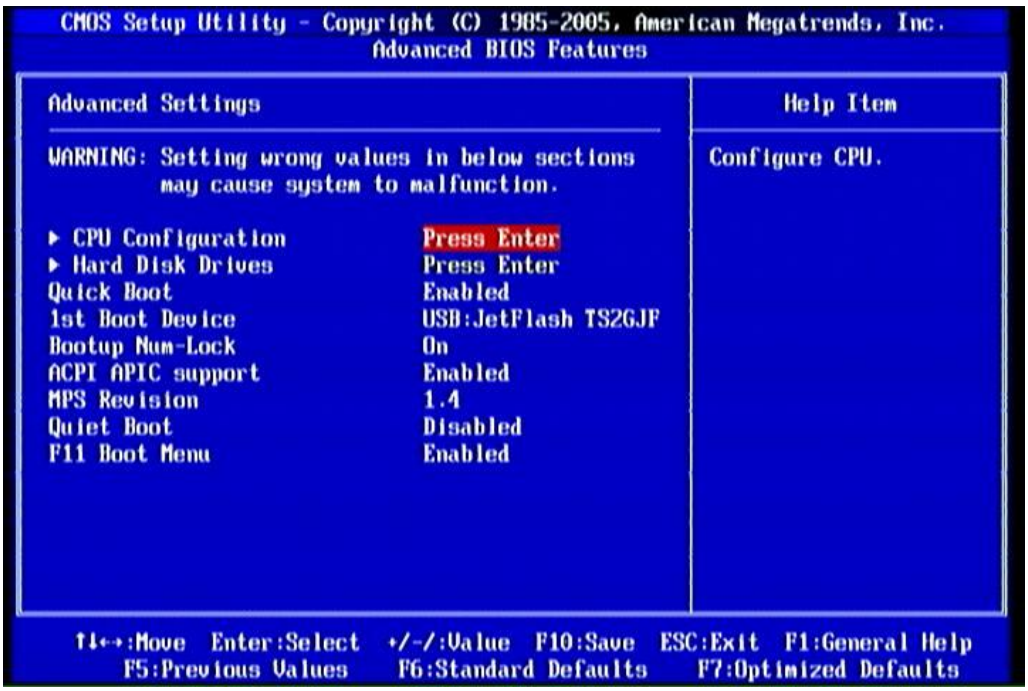
System Date
The date format is <day><month><date><year>.

Day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.
Month	The month from Jan. through Dec.
Date	The date from 1 to 31 can be keyed by numeric function keys.
Year	The year depends on the year of the BIOS.

System Time
The time format is <hour><minute><second>.

Onchip SATA 1, 2, 3, 4, 5, 6
While entering setup, BIOS auto detest the presence of IDE devices. This displays the status of auto detection of IDE devices.
LBA/Large Mode: The optional settings are Auto; Disabled.
Block (Multi-Sector Transfer): The optional settings are: Disabled and Auto.
PIO Mode: the optional settings are: Auto, 0, 1, 2, 3 and 4.
DMA MODE: the optional settings are Auto, SWDMAn, MWDMAn , UDMAn.
S.M.A.R.T.: This option allows you to enable the HDD S.M.A.R.T Capability (Self-Monitoring, Analysis and Reporting Technology). The optional settings are Auto; Disabled; and Enabled.
32 Bit Data Transfer: the optional settings are: Disabled and Enabled.
Floppy A
This item is for specific floppy disk drive settings. Select according to the specification of the floppy disk you use.
System Memory
This item will show information about the memory modules(s) installed.

Advanced BIOS Feature


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Advanced BIOS Features
Advanced Settings
Help Item
WARNING: Setting wrong values in below sections may cause system to malfunction.
Configure CPU.
▸ CPU Configuration Press Enter
▸ Hard Disk Drives Press Enter
Quick Boot Enabled
1st Boot Device USB:JetFlash TS2GJF
Bootup Num-Lock On
ACPI APIC support Enabled
MPS Revision 1.4
Quiet Boot Disabled
F11 Boot Menu Enabled
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

Quick Boot

Allows BIOS to skip certain tests while booting. This will decrease the needed to boot the system.

1st Boot Device

Specify the boot sequence from the available devices. A device enclosed in parenthesis has been disabled in corresponding type menu.

Boot Up NumLock Status

The default value is On.

On (default) Keypad is numeric keys.

Off Keypad is arrow keys.

ACPI APIC Support

Include ACPI APIC table pointer to RSDT pointer list.

MPS Revision

This option is only valid for multiprocessor motherboards as it specifies the version of the Multiprocessor Specification (MPS) that the motherboard will use.

Quiet Boot

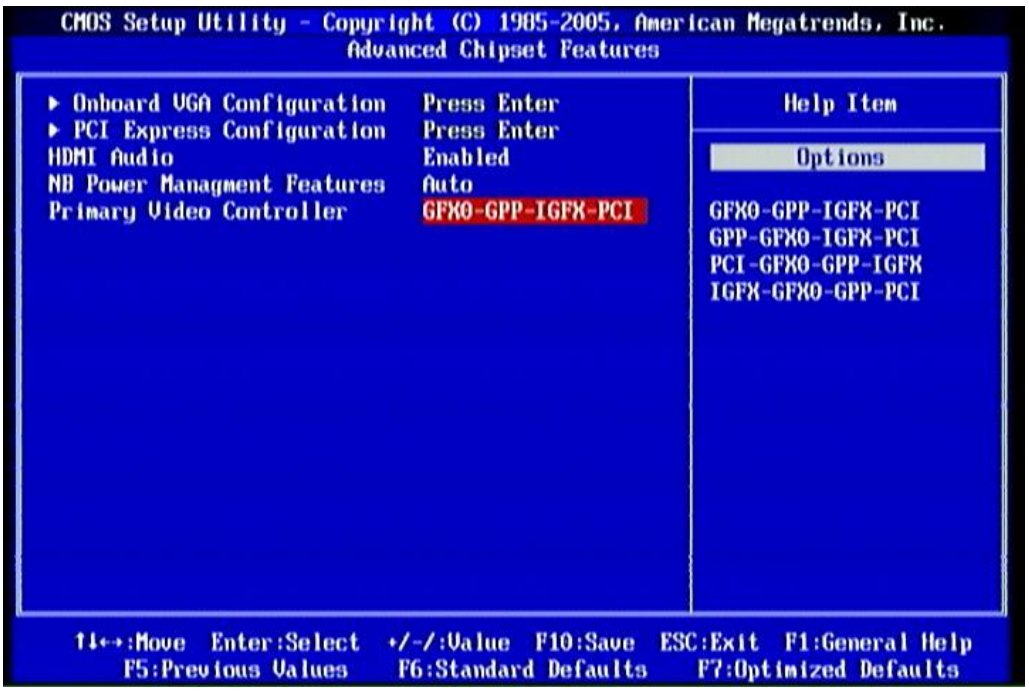
The optional settings are Enabled and Disable.

Disabled: Display normal POST message.

Enabled: Displays OME logo instead of POST message.

Advanced Chipset Features

The Advanced Chipset Features Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer.



HDMI Audio

Use this item to select HDMI audio, the optional settings are: Enabled, Disabled.

NB Power Management Features

Dynamic clock gating for IOC/NT/MCU/CFG.

Primary Video Controller

This item is for user to choose primary video controller.

Onboard VGA Configuration

Internal Graphics Mode

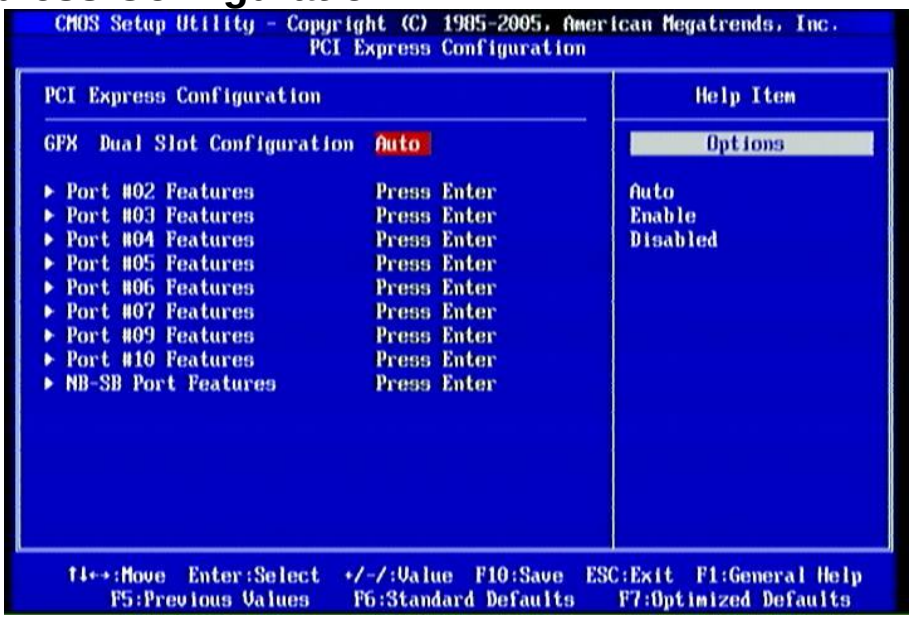
The optional settings: Disabled; UMA; SIDEPORT; UMA+SIDEPORT.

UMA Frame Buffer Size

The optional settings: Auto; 32MB; 64MB,128MB,256MB, 512MB.

SIDEPORT Clock Speed
The optional settings are from 200MHz to 667MHz.
GFX Engine Clock Override
The optional settings are: Enable; Disabled.
GFX Engine Clock
Use this item to set GFX Engine clock in the range of 150 to 1000.
UMA-SP Interleave Mode
The optional settings are: Auto, Coarse and Fine.
SP Power Management
The optional settings are: Auto, Dynamic CKE, Dynamic CMD, Dynamic CLK and Disabled.
FB Location
The optional settings are: Above 4G and Below 4G.

PCI Express Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
PCI Express Configuration
PCI Express Configuration
Help Item
GFX Dual Slot Configuration Auto
Options
Port #02 Features Press Enter
Port #03 Features Press Enter
Port #04 Features Press Enter
Port #05 Features Press Enter
Port #06 Features Press Enter
Port #07 Features Press Enter
Port #09 Features Press Enter
Port #10 Features Press Enter
NB-SB Port Features Press Enter
Auto
Enable
Disabled
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

GFX Dual Slot Configuration
The optional settings are: Auto; Enable; and Disabled.
Port #02 Features ~ Port #03 Features
Press Enter and set values in the sub-items as: Gen2 High Speed Mode, Link ASPM, and Link width.
Port #04 Features~ Port #10 Features
Press Enter and set values in the sub-items as Gen2 High Speed Mode, and Link ASPM.
NB-SB Port Features
Press Enter and set values in the sub-items as NB-SB Link ASPM,;NP NB-SB VC1 Traffic Support and Link Width.

Integrated Peripherals

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Integrated Peripherals
OnChip SATA Channel Enabled
OnChip SATA Type Native IDE
OnChip IDE Type Legacy IDE
SATA port 5/6 Enabled
JMicron 368 ATA Controller Enabled
Onboard PCIELan Enabled
Onboard Lan BootROM Disabled
HD Audio Azalia Device Enabled
Legacy USB Support Enabled
BIOS EHCI Hand-Off Enabled
USB Keyboard Legacy Support Enabled
USB Mouse Legacy Support Enabled
USB Devices Enabled :
1 Drive
OnBoard Floppy Controller Enabled
Serial Port1 Address 3F8/IRQ4
Serial Port2 Address Disabled
Help Item
Options
Disabled
Enabled
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

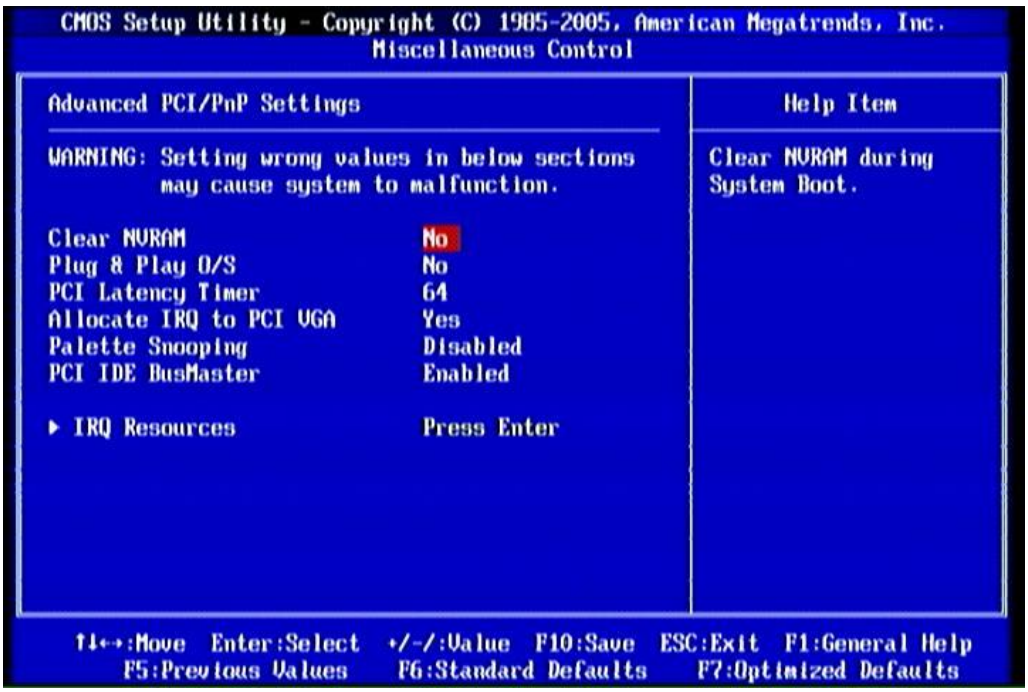
OnChip SATA Channel
Press Enter to enable or disable CnChip SATA Channel.
0nChip SATA Type
Press Enter to select the SATA type. The optional settings are: Native IDE; RAID; AHCI; Legacy IDE.
0nChip IDE Type
The optional settings are Legacy IDE and Native IDE.
Onboard PCI E Lan
Use this item to enable or disable Onboard PCI E Lan.
Onboard Lan BootROM
The optional settings are: Disabled; Enabled.
HD Audio Azalia Device
This item allows you to decide to enable/disable the chipset family to support HD Audio. The optional settings are: Auto; Enabled and Disabled.
Legacy USB Support
Use this item to enable support for legacy USB. Auto Option disables legacy support if no USB devices are connected. The optional settings are: Disabled; Enabled; AUTO.
BIOS EHCI Hand-off
The optional settings are: Disabled; Enabled. This is a workaround for OSes without EHCI hand-ofF support.The EHCI ownership change should claim by EHCI driver.
USB Keyboard//Mouse Legacy Support
Use these items to enable legacy support for USB keyboard/mouse.
Serial Port1/2 Address
Use these items to allow BIOS to select serial port1/2 base address.

Power Management Features

The Power Management Setup allows you to configure your system to most effectively save energy saving while operating in a manner consistent with your own style of computer use.

Suspend mode
Use this item to select the ACPI state used for system suspend. The optional settings are: S1(POS); S3(STR).
Power On by PCIE(WOL)/ Keyboard/ Mouse
The optional settings are: Enabled; Disabled.

Miscellaneous Control



Plug &Play O/S
The optional settings are: No; Yes
No: Let the BIOS configure all the devices in the system.
Yes: Let the operating system configure Plug and Play devices, not required for boot if

your system has a Plug and Play operating system.

PCI Latency Timer

Value in units of PCI clocks for PCI device latency timer register.

Allocate IRQ for PCI VGA

The optional settings are: No; Yes.

Yes: Assigns IRQ to PCI VGA card if card requests IRQ.

No: Does not assign IRQ to PCI VGA card even card requests an IRQ.

Palette Snooping

The optional settings are: Enabled; Disabled.

Enable: inform the PCI device that an ISA graphics devices is installed in the system so the card will function correctly.

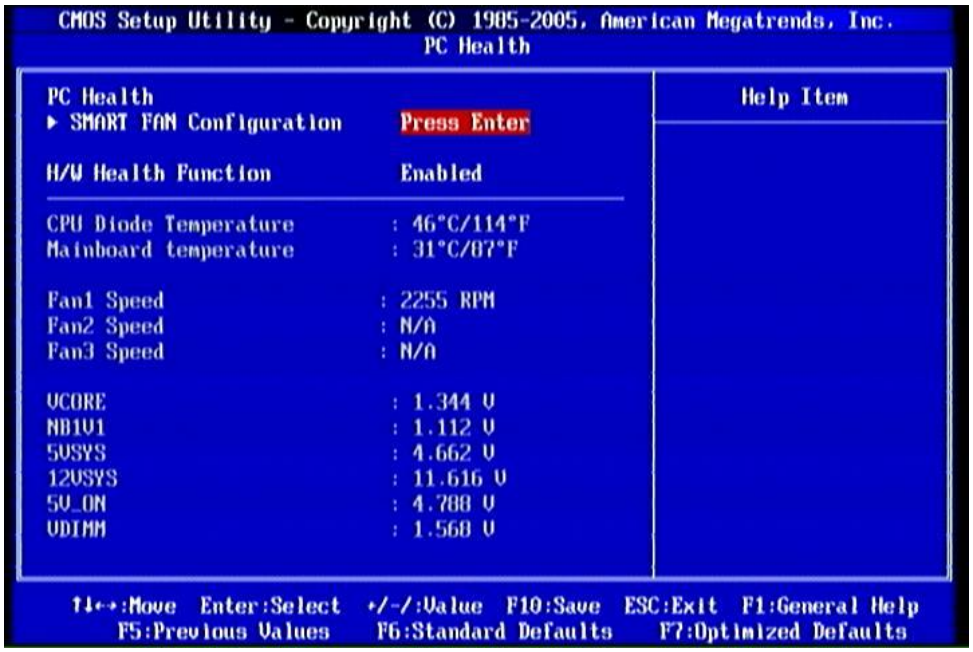
PCI IDE Bus Master

The optional settings are: Enabled; Disabled.

Enable: BIOS uses PCI busmastering for reading/writing IDE devices.

PC Health

This section shows the Status of you CPU, Fan, and Warning for overall system status. This is only available if there is Hardware Monitor onboard.


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
PC Health
PC Health
▶ SMART FAN Configuration
Press Enter
H/W Health Function
Enabled
CPU Diode Temperature : 46°C/114°F
Mainboard temperature : 31°C/87°F
Fan1 Speed : 2255 RPM
Fan2 Speed : N/A
Fan3 Speed : N/A
VCORE : 1.344 V
NB1V1 : 1.112 V
5VSYS : 4.662 V
12VSYS : 11.616 V
5V_ON : 4.788 V
VDIMM : 1.568 V
Help Item
↑↓←→:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

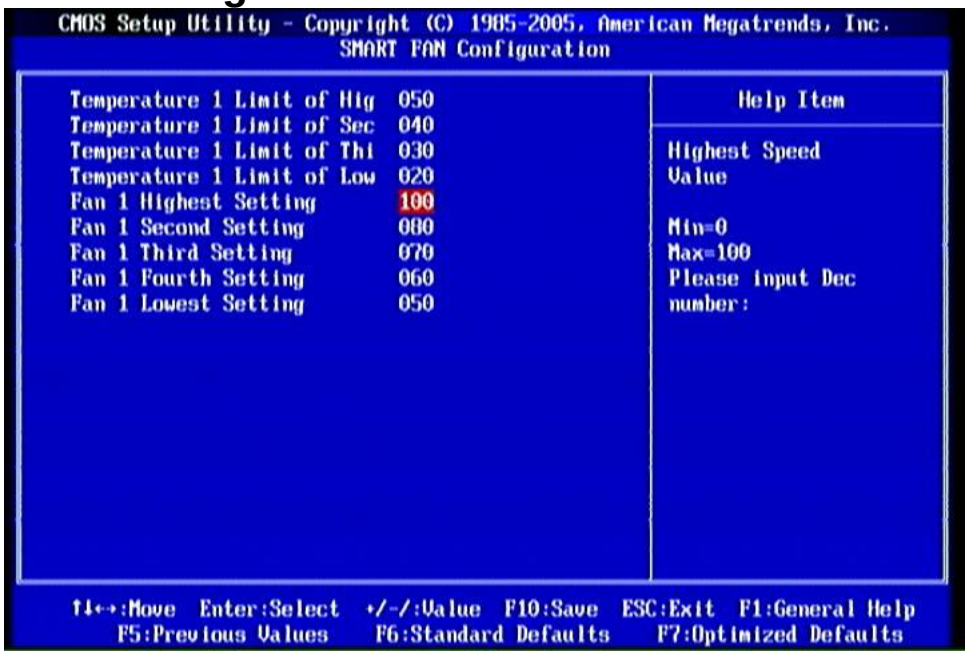
H/W Health Function,

it displays information list below when set as below. The choice is either Enabled or Disabled.

CPU Diode Temperature/ Motherboard Temperature/ FAN1 Speed /FAN12 Speed/FAN3 Speed/VCORE/NB1V1/5VSYS/12VSYS/5V_ON/VDIMM

This will show the CPU/ /System voltage chart and FAN Speed, etc.

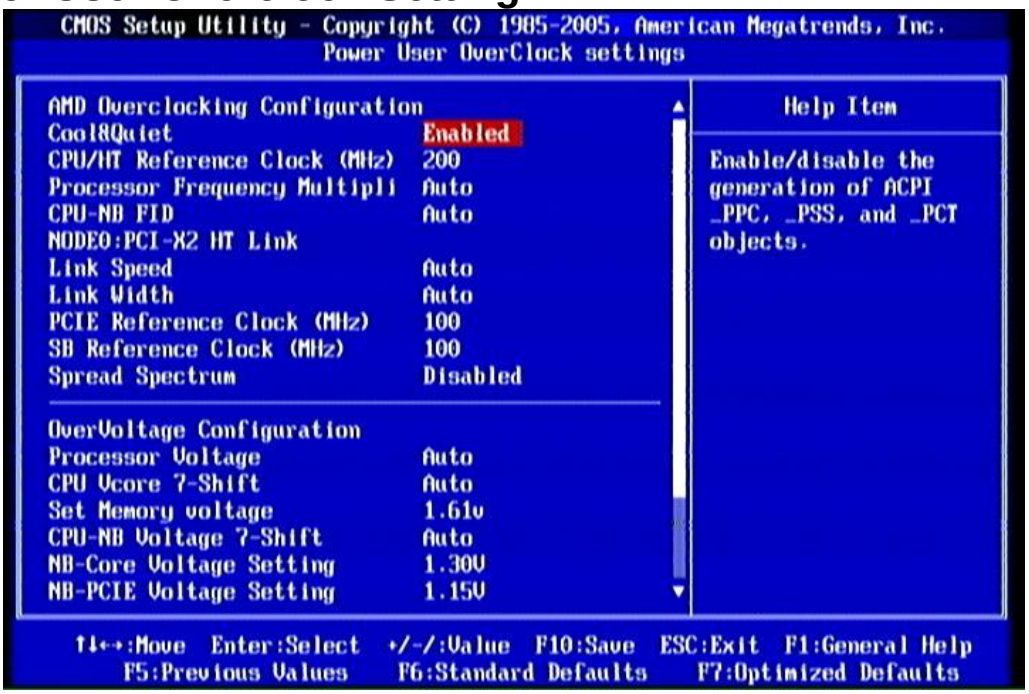
Smart FAN Configuration

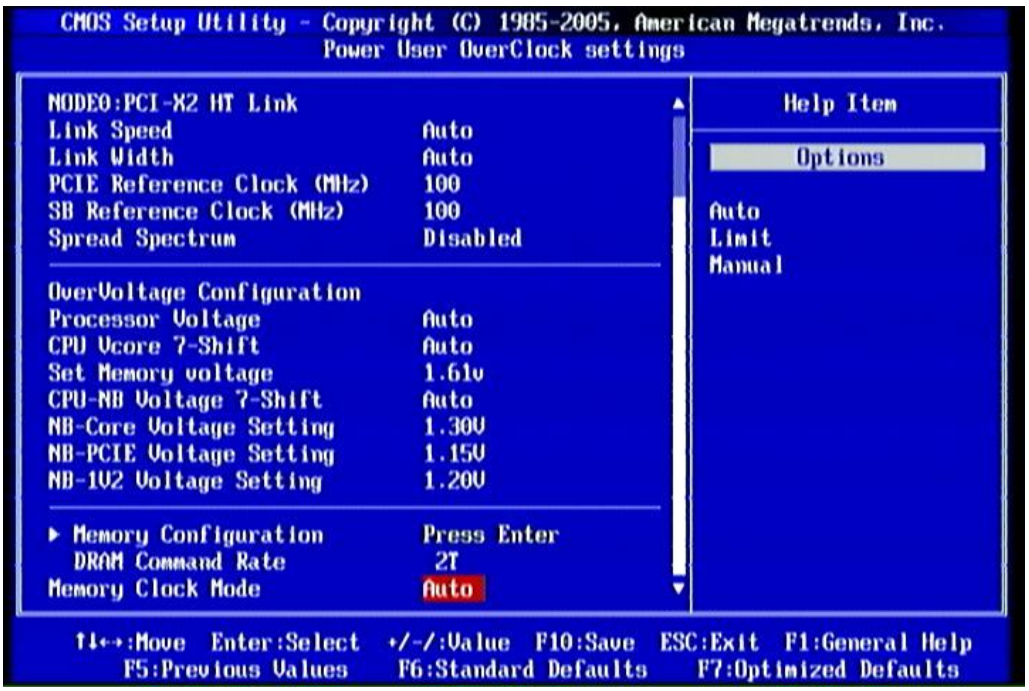

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
SMART FAN Configuration
Temperature 1 Limit of Hig 050
Temperature 1 Limit of Sec 040
Temperature 1 Limit of Thi 030
Temperature 1 Limit of Low 020
Fan 1 Highest Setting 100
Fan 1 Second Setting 080
Fan 1 Third Setting 070
Fan 1 Fourth Setting 060
Fan 1 Lowest Setting 050
Help Item
Highest Speed Value
Min=0
Max=100
Please input Dec number:
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

Temperatue1Limit of Hig/Sec/Thi/Low
The setting range is from a Minimum value of 0°C to a maximum value of 127°C

Fan1 Highest/Second/Third/Fourth/Lowest Setting
The setting range is from a Minimum value of 0 to a maximum value of 100.

Power User Overclock Setting


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Power User OverClock settings
AMD Overclocking Configuration
Cool&Quiet Enabled
CPU/HT Reference Clock (MHz) 200
Processor Frequency Multipli Auto
CPU-NB FID Auto
NODE0:PCI-X2 HT Link
Link Speed Auto
Link Width Auto
PCIE Reference Clock (MHz) 100
SB Reference Clock (MHz) 100
Spread Spectrum Disabled
OverVoltage Configuration
Processor Voltage Auto
CPU Vcore 7-Shift Auto
Set Memory voltage 1.61v
CPU-NB Voltage 7-Shift Auto
NB-Core Voltage Setting 1.30V
NB-PCIE Voltage Setting 1.15V
Help Item
Enable/disable the generation of ACPI _PPC, _PSS, and _PCT objects.
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults



CPU/HT Reference Clock

Use this item to set CPU/HT Reference Clock. The optional setting range is:190~600 MHz.

Processor Frequency Multiplier

The optional settings are: Auto and a setting range from x4.0 (800 MHz)to x35.0 (7000 MHz).

CPU-NB FID

The optional settings are: Auto; x4 ~x31.

Link Speed

The HyperTransport link will run at this speed if it slower than or equal to system clock and this board is capable

Link Width

The HyperTransport link will run at this width.

PCI E Reference Clock (MHz)

The optional setting range is:90~250 MHz.

SB Reference Clock (MHz)

The optional setting range is:90~150 MHz.

Spread Spectrum

The optional settings are: Disabled; SRC CLK; CPUHT CLK and All CLK.

Processor Voltage

The optional settings are: Auto; 0.800V~1.350V.
Warning:Setting some values too high may cause system to malfunction.

CPU Vcore 7-Shift

Use this item to set value in CPU Vcore 7-Shift function. The optional settings are: Auto; 50mV to 350 mV.
Warning:Setting some values too high may cause system to malfunction.

Set Memory Voltage

Use this item to set memory voltage. The optional setting rang is from 1.65V to 2.25V.

Warning:Setting some values too high may cause system to malfunction.

CPU-NB Voltage 7-Shift

Use this item to set value in CPU Vcore 7-Shift function. The optional settings are: Auto; 50mV to 350 mV.

NB-Core Voltage Setting

The optional settings are from 1.30v to 1.45v.
Warning:Setting some values too high may cause system to malfunction.

NB-PCIE Voltage Setting

The optional settings are from 1.10v to 1.25v.
Warning:Setting some values too high may cause system to malfunction.

NB-1V2 Voltage Setting

The optional settings are:1.20v;1.25V.
Warning:Setting some values too high may cause system to malfunction.

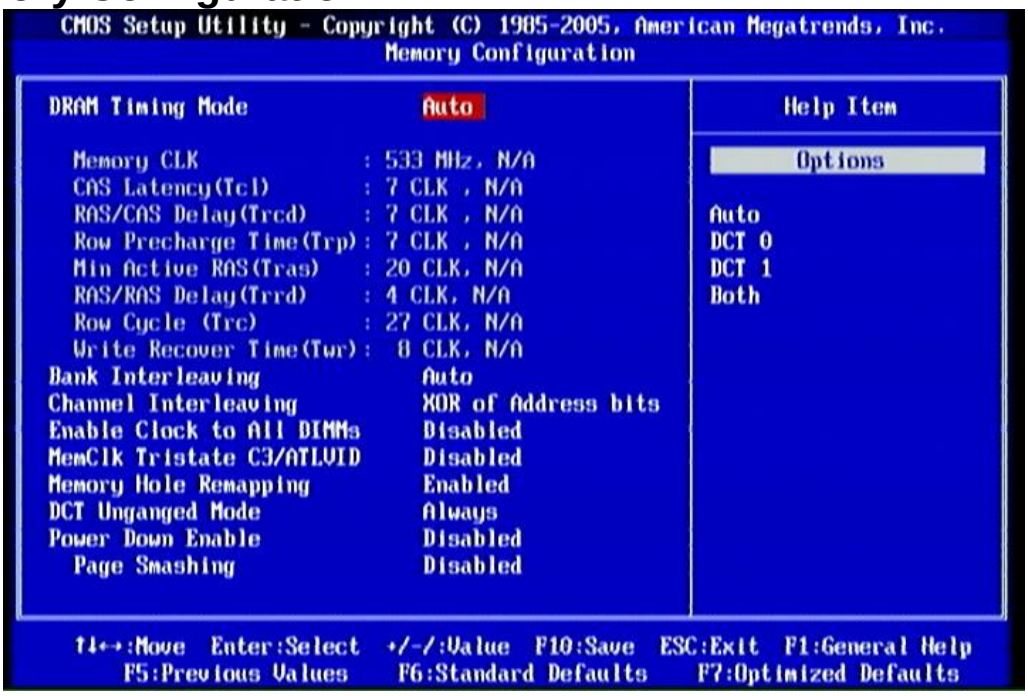
DRAM Command Rate

The optional settings are: Auto; 1T and 2T.

Memory Clock Mode

The optional settings are: Auto; Limit and Manual.

Memory Configuration


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
Memory Configuration
DRAM Timing Mode Auto
Memory CLK : 533 MHz, N/A
CAS Latency(Tcl) : 7 CLK , N/A
RAS/CAS Delay(Trcd) : 7 CLK , N/A
Row Precharge Time(Trp) : 7 CLK , N/A
Min Active RAS(Tras) : 20 CLK, N/A
RAS/RAS Delay(Trrd) : 4 CLK, N/A
Row Cycle (Trc) : 27 CLK, N/A
Write Recover Time(Twr) : 8 CLK, N/A
Bank Interleaving Auto
Channel Interleaving XOR of Address bits
Enable Clock to All DIMMs Disabled
MemClk Tristate C3/ATLVID Disabled
Memory Hole Remapping Enabled
DCT Unganged Mode Always
Power Down Enable Disabled
Page Smashing Disabled
Help Item
Options
Auto
DCT 0
DCT 1
Both
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

DRAM Timing Mode

The optional settings are: Auto; DCT0, DCT1 and Both.

Bank Interleaving

Use this item to enable bank memory interleaving.

Channel Interleaving

The optional settings: Disabled; Address bits 6; Address bits 12; XOR of Address bits [2.:16,6]; XOR of Address bits [20:16,9].

Enable Clock to ALL DIMMs

Enable unused clocks to DIMMS when memory slots are not populated.

Mem CLK Tristate during C3 and Alt VID.

Enable and disable Mem CLK Tri-stating during C3 and Alt VID

Memory Hole Remapping

Enable Memory Remapping around Memory Hole.

DCT Unganged Mode

This allows selection of unganged DRAM MODE (64- bit width).
Auto=Ganged Mode; Always= Unganged Mode.

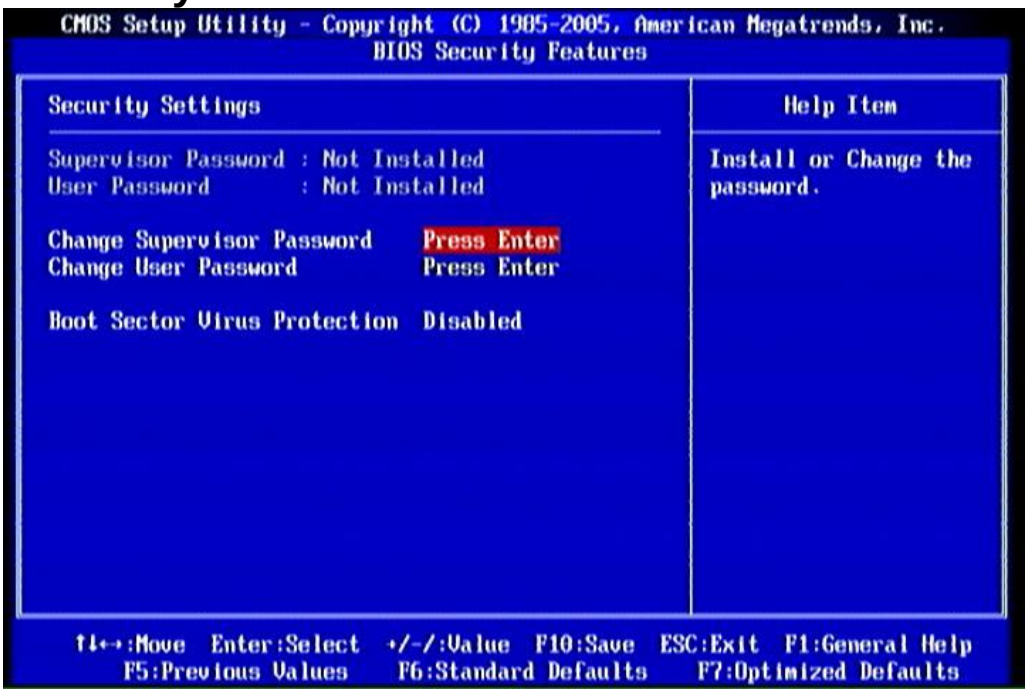
Power Down Enable

Enable or Disable power down mode.

Page Smashing

S/W control of Page Smashing Mechanism.The optional settings are: Disabled; IC; DC; Both.

BIOS Security Features


CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
BIOS Security Features
Security Settings
Help Item
Supervisor Password : Not Installed
User Password : Not Installed
Install or Change the password.
Change Supervisor Password Press Enter
Change User Password Press Enter
Boot Sector Virus Protection Disabled
↑↓↔:Move Enter:Select +/-/:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Standard Defaults F7:Optimized Defaults

You can set either supervisor or user password, or both of them. The differences are:

Supervisor password: Can enter and change the options of the setup menus.

User password: Can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again

and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If set to “Setup”, prompting only occurs when trying to enter Setup.

Load Optimal Defaults/ Load Failsafe Defaults

Load Optimal Defaults

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

Pressing <OK> loads the default values that are factory settings for optimal performance system operations.

Load Failsafe Defaults

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

Pressing <OK> loads the default values that are factory settings for stable performance system operations.

Save Changes and Exit / Discard Changes and Exit

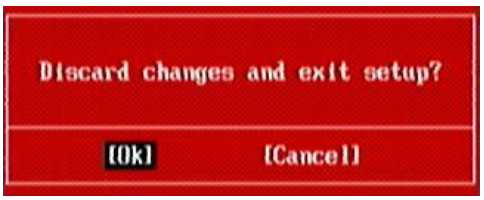
Save Changes and Exit

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

Pressing <OK> save the values you made previously and exit BIOS setup.

Discard Changes and Exit

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:



Pressing <OK> to leave BIOS setting without saving previously set values.

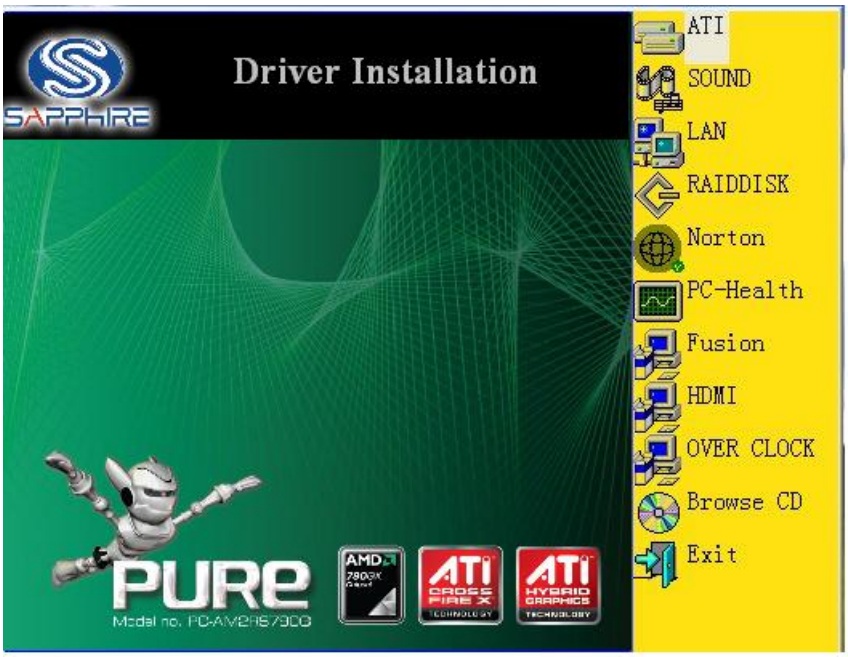
Notice!	The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard . Users are welcome to download the latest BIOS version form our official website.

Driver & Free Program Installation

Check your package and there is A MAGIC INSTALL CD included. This CD consists of all DRIVERS you need and some free application programs and utility programs. In addition, this CD also include an auto detect software which can tell you which hardware is installed, and which DRIVERS needed so that your system can function properly. We call this auto detect software MAGIC INSTALL.

Driver Install supports Windows XP/Vista/7

Insert CD into your CD-ROM drive and the MAGIC INSTALL Menu should appear as below. If the menu does not appear, double-click MY COMPUTER / double-click CD-ROM drive or click START / click RUN / type X:\SETUP.EXE (assuming X is your CD-ROM drive).

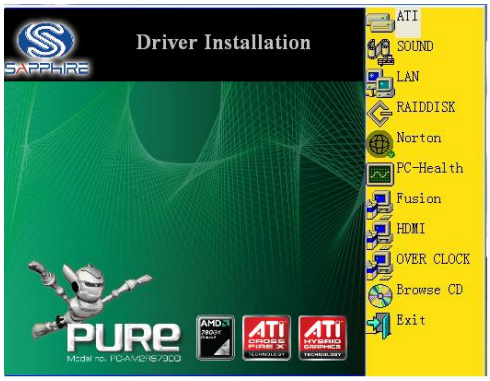


From MAGIC INSTALL MENU you may take 11 selections:

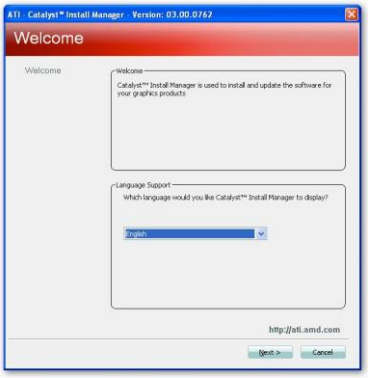
1. ATI to install ATI integrated driver pack
2. Sound to install ALC HD audio codec driver
3. LAN to install Realtek gigabit ethernet NIC driver
4. RAIDDISK to install ATI SATA Driver and Utility
5. Norton to install Norton 2010 Anti-virus Program
6. PC-HEALTH to install MyGuard hardware monitor utility
7. Fusion to download Fusion drives and tools
8. HDMI to install ATI HDMI audio driver
9. OVERCLOCK to install overclock driver utility
10. BROWSE CD to browse the contents of the CD
11. EXIT to exit from MAGIC INSTALL menu

NOTICE! If your OS is Windows XP, Please upgrade IT to Service Pack 3 before your installing this driver.

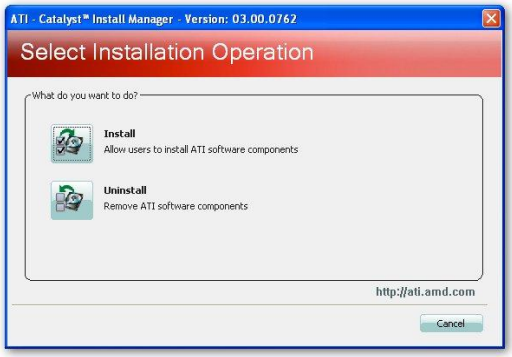
ATI Integrated Drive Pack



1. Click ATI when Magic Install menu appears.



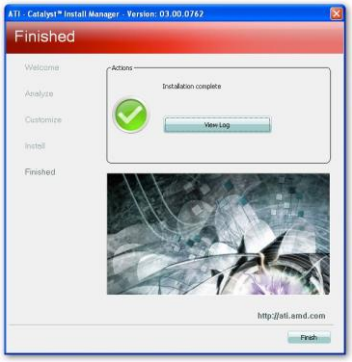
2. Select the setup language then click Next.



3. Click Install to begin installation.

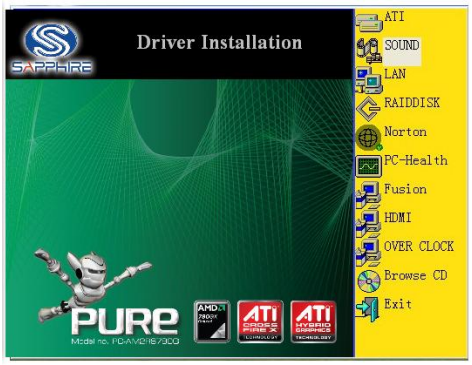
4. Select default installation location then click Next.

5. Click Accept to accept the License Agreement to continue.

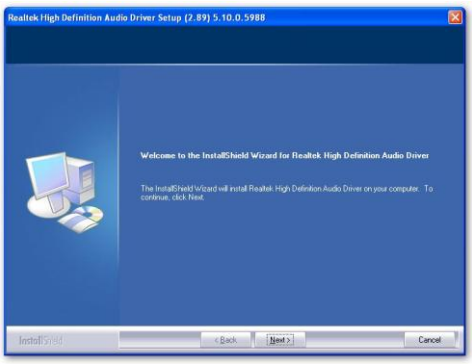


6. Click Finish to complete the installation.

Install ALC888 HD Audio Codec Driver

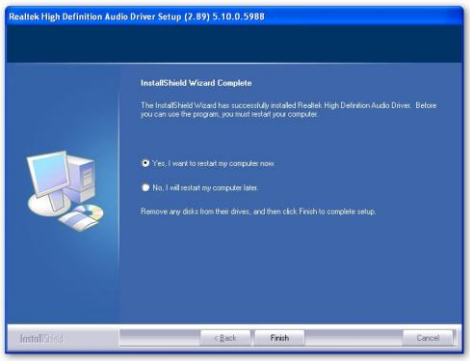


1. Click SOUND when Magic Install menu


Realtek High Definition Audio Driver Setup (2.89) 5.10.0.5988
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
Back
Next >
Cancel

2. Click Next When Realtek High Definition

appears.



3. Click Finish and restart your computer.

Audio driver windows appear.

4. Manual Sound Effect Setting.

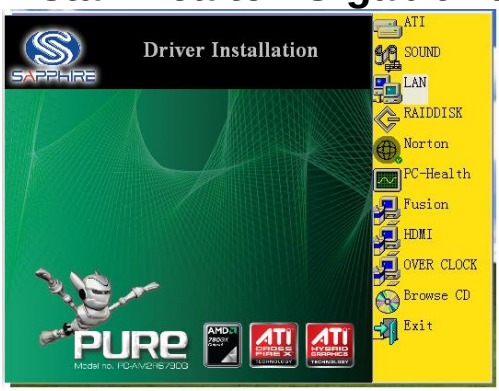
5. mixer setting.

6. Audio input and output setting.

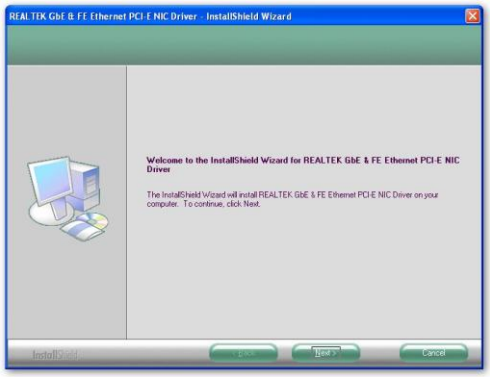
7. Microphone effect setting.

8. 3D demo setting.

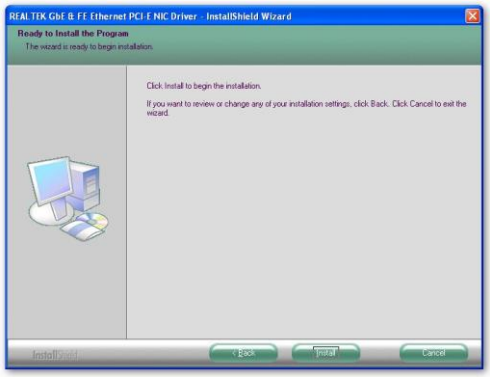
Install Realtek Gigabit Ethernet NIC Driver



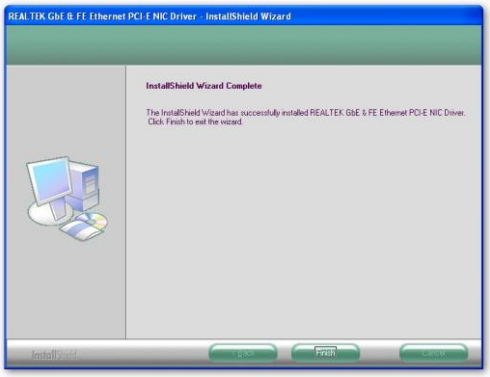
1 Click LAN when Magic Install Menu appears


REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
Welcome to the InstallShield Wizard for REALTEK GbE & FE Ethernet PCI-E NIC Driver
Cancel

2. Click NEXT, install LAN and Fast Ethernet NIC Driver

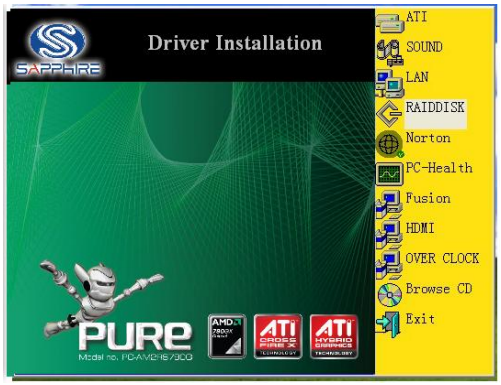

REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

3 Click install to begin the installation.

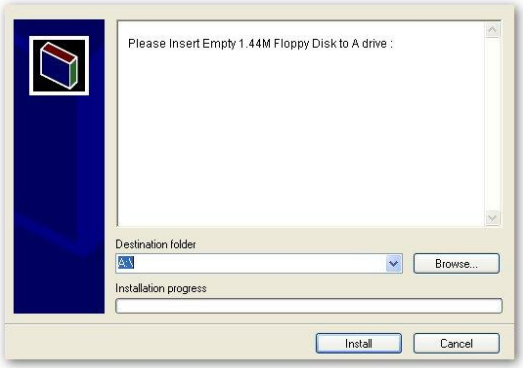

REALTEK GbE & FE Ethernet PCI-E NIC Driver - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed REALTEK GbE & FE Ethernet PCI-E NIC Driver. Click Finish to exit the wizard.
InstallShield
< Back
Finish
Cancel

2. Installation completed, Click Finish..

Install ATI SATA Driver and Utility

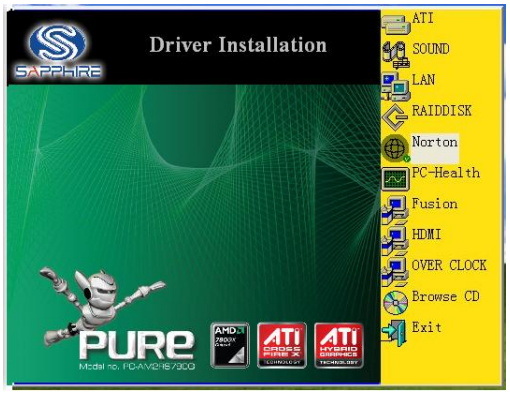


1 Click RAIDDisk when Magic Install menu appears



2. Copy the files to floppy disk and restart the computer with floppy disk as the first booting disk and then follow the steps shown on the screen to finish RAID function settings.

Install Norton 2009 Anti-virus Program

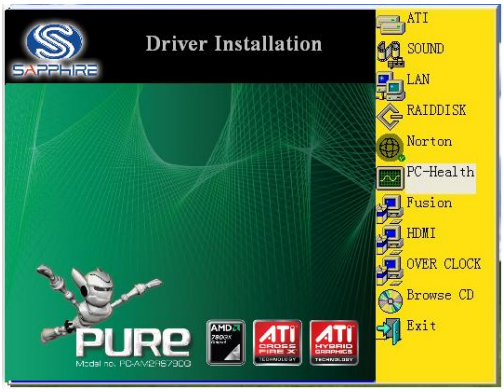


1 Click Norton when Magic Install menu appears.

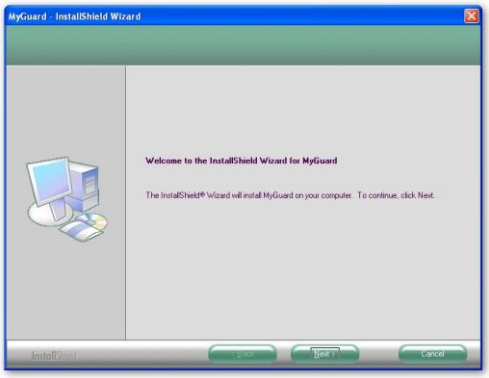
Norton Internet Security 2010
Thank you for choosing Norton Internet Security 2010.
By clicking "Agree & Install," you agree to the
User License Agreement
Agree & Install
Install Options
Norton Community Watch
Norton

2. Click Agree & Install after reading Unser License Agreement.

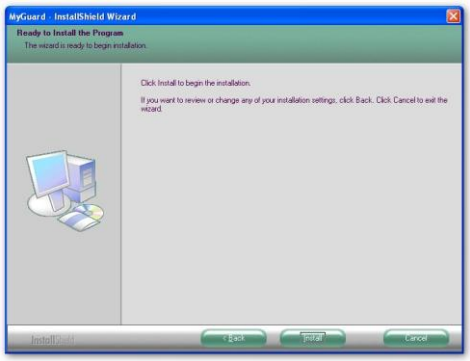
Install MyGuard Hardware Monitor Utility



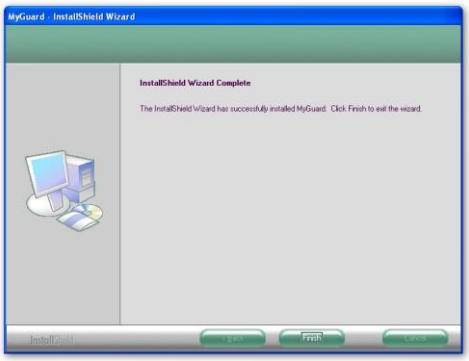
1. Click PC-HEALTH when Magic Install menu appears


MyGuard - InstallShield Wizard
Welcome to the InstallShield Wizard for MyGuard
The InstallShield® Wizard will install MyGuard on your computer. To continue, click Next.
Cancel

2. Click Next on Install shield wizard Window appears

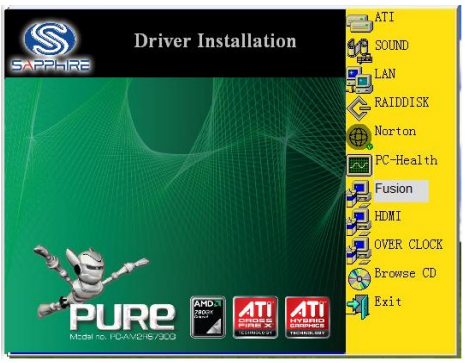


3. Click Install to begin the installation.


MyGuard - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed MyGuard. Click Finish to exit the wizard.
Finish

4. Click Finish to complete the installation.

Install Fusion Drivers and Tools



5. Click Fusion when Magic Install menu appears.

AMD Fusion for Gaming
Welcome to the AMD Fusion for Gaming Setup Wizard
The installer will guide you through the steps required to install AMD Fusion for Gaming on your computer.
AMD FUSION FOR GAMING SOFTWARE END USER LICENSE AGREEMENT
I Do Not Accept
I Accept
Back
Next >
Cancel

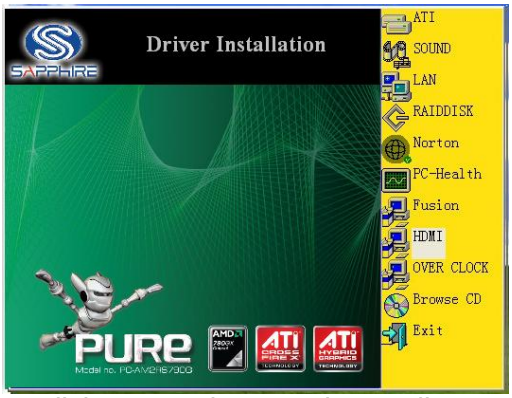
6. Click to accept the license agreement then click Next.

AMD Fusion for Gaming
Select Installation Folder
The installer will install AMD Fusion for Gaming to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Program Files\AMD\AMD Fusion for Gaming\
Browse...
< Back
Next >
Cancel

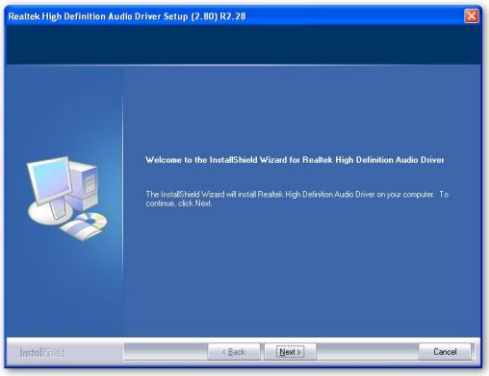
7. Select installation folder then click Next.

8. Click Close to complete the installation.

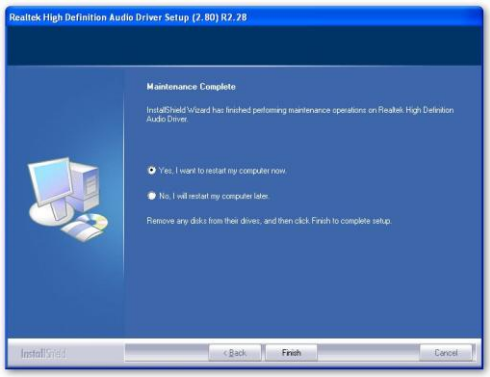
Install HDMI Audio Driver



1. Click HDMI when Magic Install menu appears

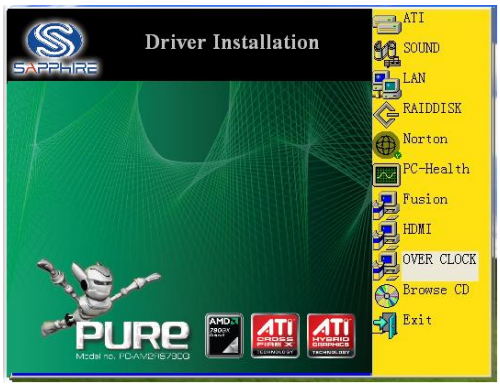

Realtek High Definition Audio Driver Setup (2.80) R2.28
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

2. Click Next on Install shield wizard Window.

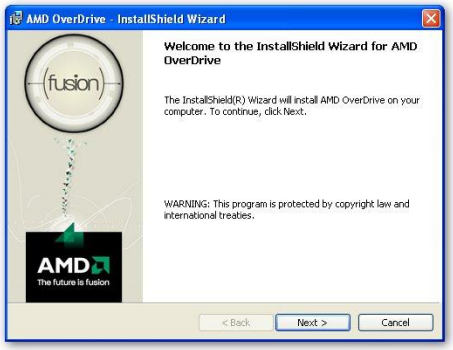

Realtek High Definition Audio Driver Setup (2.80) R2.28
Maintenance Complete
InstallShield Wizard has finished performing maintenance operations on Realtek High Definition Audio Driver.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

3. Select if you want to restart the computer and then click Finish.

Install AMD Over-Drive Utility

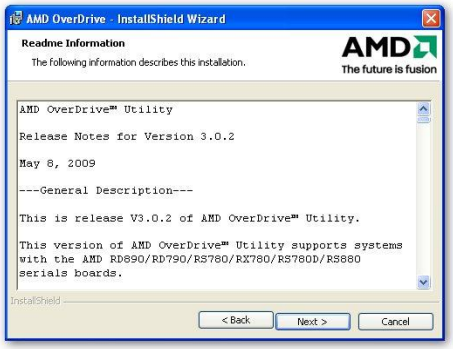


1. Click OVER CLOCK when Magic Install menu appears

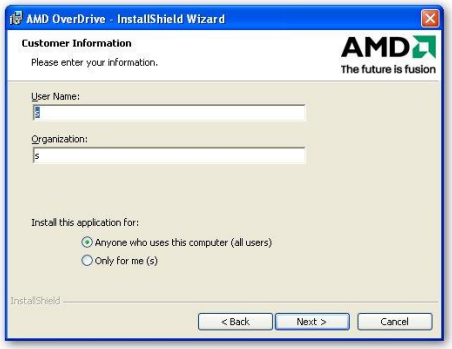

AMD OverDrive - InstallShield Wizard
Welcome to the InstallShield Wizard for AMD OverDrive
The InstallShield(R) Wizard will install AMD OverDrive on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
AMD
The future is fusion
< Back
Next >
Cancel

2. Click Next on AMD OverDriver installation wizard.

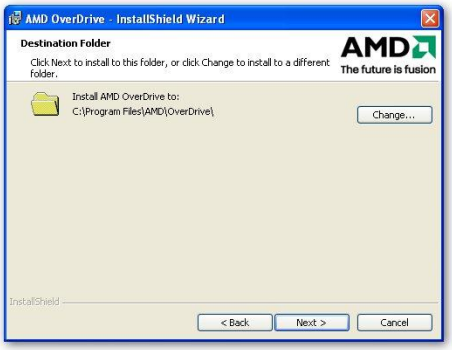
AMD OverDrive - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
AMD
The future is fusion
End User License Agreement
Overclocking Utility
PLEASE READ THIS LICENSE AGREEMENT (the "License") CAREFULLY BEFORE USING THE SOFTWARE. IF YOU ACCEPT THESE TERMS BY CLICKING ACCEPT, OR IF YOU USE THE SOFTWARE, YOU ARE AGREEING TO BE BOUND BY THE TERMS OF THIS LICENSE.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel


AMD OverDrive - InstallShield Wizard
Readme Information
The following information describes this installation.
AMD
The future is fusion
AMD OverDrive™ Utility
Release Notes for Version 3.0.2
May 8, 2009
---General Description---
This is release V3.0.2 of AMD OverDrive™ Utility.
This version of AMD OverDrive™ Utility supports systems with the AMD RD890/RD790/RS780/RX780/RS780D/RS880 serials boards.
InstallShield
< Back
Next >
Cancel

3. Choose “I accept the terms in the license agreement”.

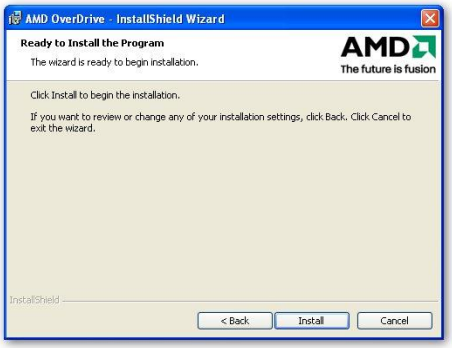


4. The information describes the installation, Click Next after you finish reading it.



5. Type in Customer Information and then click Next.

6. Select the Destination Folder and then Click Next.


AMD OverDrive - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
AMD
The future is fusion
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

7. Decide whether you want a shortcut on your desktop and then click Next.

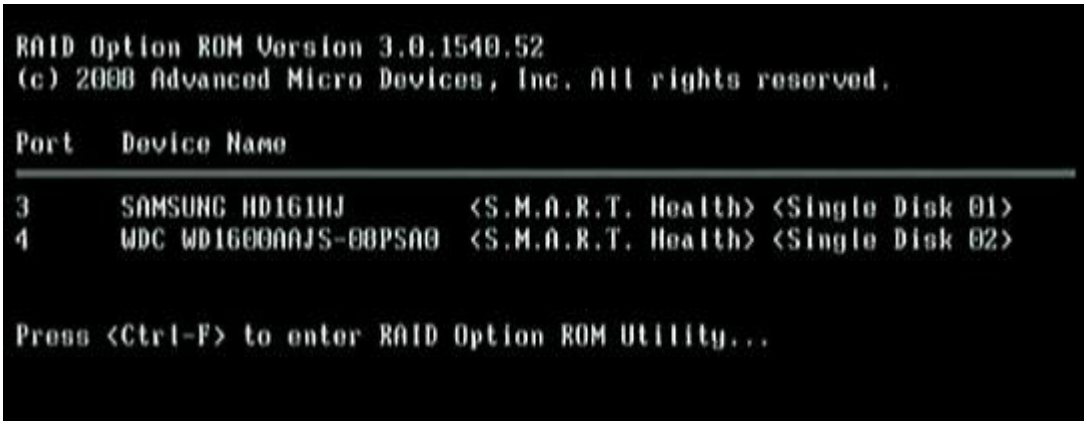
8. Click Install to begin installation.

9. Finish the installation.

NOTICE!	The above driver screen and operation steps are for reference only because we might update the drivers or make modifications due to technological need and user’s benefits. We reserve these changes or upgrade without advanced notification. Please visit our website for possible driver upgrade.

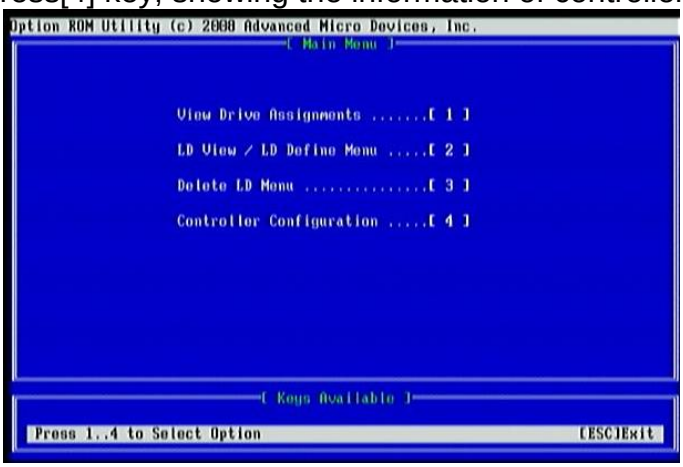
AMD Platform RAID Function Installation

Please set these choice in the BIOS as RAID：BIOS setup \Integrated Peripherals \Onboard SATA Type. When the below figures appeared, please press [Ctrl-F] into figure 2



[figure1]

Function: press[1] key, showing the RAID; press [2] key，building RAID; press [3] key, delete the RAID; press[4] key, showing the information of controller.



[figure2]

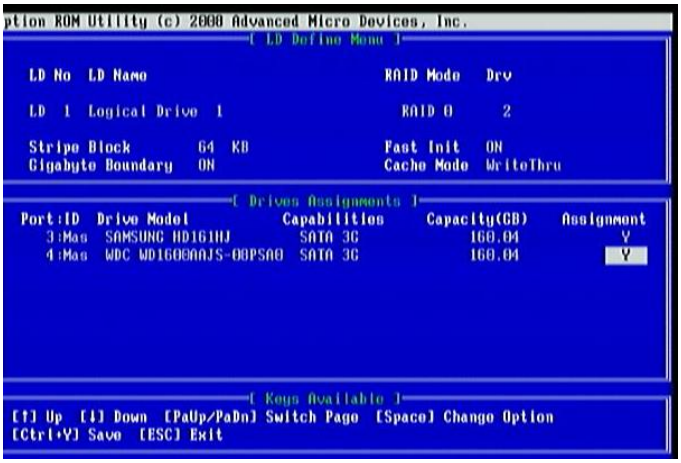
press[1] key，showing the RAID，as the below figure

[figure3]

Press [2] key, the interface of RAID, as figure 4.

RAID function:

RAID 1/ RAID 0/ RAID 10 / RAID5/JBOD

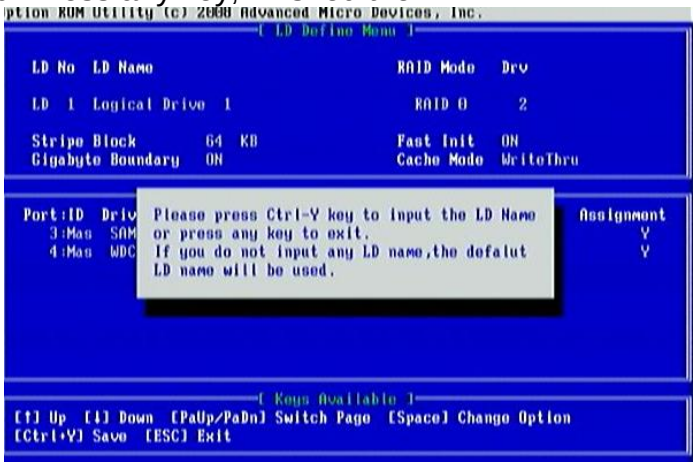

ption ROM Utility (c) 2008 Advanced Micro Devices, Inc.
[LD Define Menu]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 0 2
Stripe Block 64 KB Fast Init ON
Gigabyte Boundary ON Cache Mode WriteThru
[Drives Assignments]
Port:ID Drive Model Capabilities Capacity(GB) Assignment
3:Mas SAMSUNG HD161HJ SATA 3G 160.04 Y
4:Mas WDC WD1600AAJS-00PSA0 SATA 3G 160.04 Y
[Keys Available]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
[Ctrl+Y] Save [ESC] Exit

[figure4]

Choose LD 1 then press[Ctrl+C] to building RAID.

Take Raid0 for example, use [↑] [↓] to shift the cursor, press space key to change the choice, press [Ctrl-Y] to save.

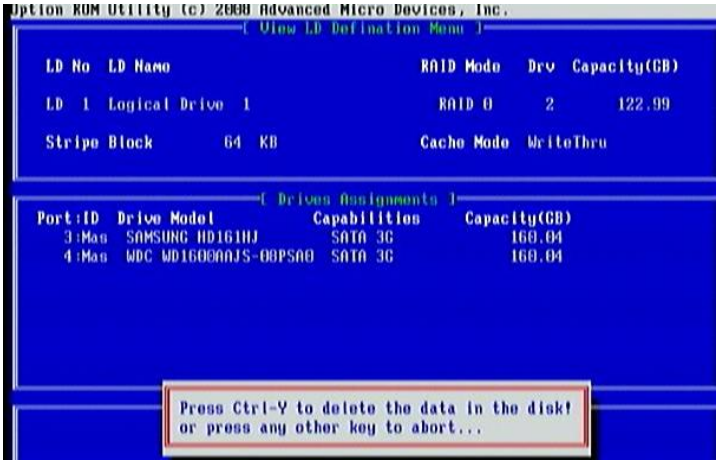
Set Assignment mode as [Y], press [Ctrl-Y] to save, and then figure 5 appeared. Enter array capacity , afterwards it will reminds you to erase the MBR. Choose [Ctrl-Y], figure 6 appeared. Press any key, finished the RAID.


ption ROM Utility (c) 2008 Advanced Micro Devices, Inc.
[LD Define Menu]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 0 2
Stripe Block 64 KB Fast Init ON
Gigabyte Boundary ON Cache Mode WriteThru
Please press Ctrl-Y key to input the LD Name
or press any key to exit.
If you do not input any LD name,the defalut
LD name will be used.
Assignment
Y
Y
[Keys Available]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
[Ctrl+Y] Save [ESC] Exit

[figure5]

[figure6]

Press [3], delete the RAID mode, as figure 7.press [Delete] will delete the array. As figure 7 .



[figure7]

Press [4], showing the information of controller, as figure 8.

Option ROM Utility (c) 2008 Advanced Micro Devices, Inc.
[Adapter Configuration - Options]
No Parameters Defined for Current Disk(s)...
[System Resources Configuration]
Controller IRQ: 11
AHCI HBA MMIO Base Address: FE5FFC00
[Keys Available]
[ESC] Exit

[figure8]

Making RAID driver diskette before Install WindowsXP/Vista/7

Before you install the Windows OS, you will need to make a RAID driver diskette before you start to install the Operating System.

How to make a RAID driver diskette?

1: Insert the diskette which is being formatted in floppy drive on a system which can start OS.
2: After booting OS insert the bundle CD in your CD-ROM
3: Copy all the files from\AMD\RAIDDisk to floppy diskette
Once you have the SATA driver diskette ready, you may start to install Windows OS on your System.

Installation of Windows OS

For installation of Windows OS, please insert installation CD into the CD-ROM drive. Then remove the floppy diskette, and boot the system. At the very beginning, you will see the message at the bottom of screen, "Press F6 if you need to install a third party SCSI or RAID driver…."
At this moment, please press <F6> key and follow the instructions of Windows operating system for the proper installation.

Pro Magic Plus Function Introduction

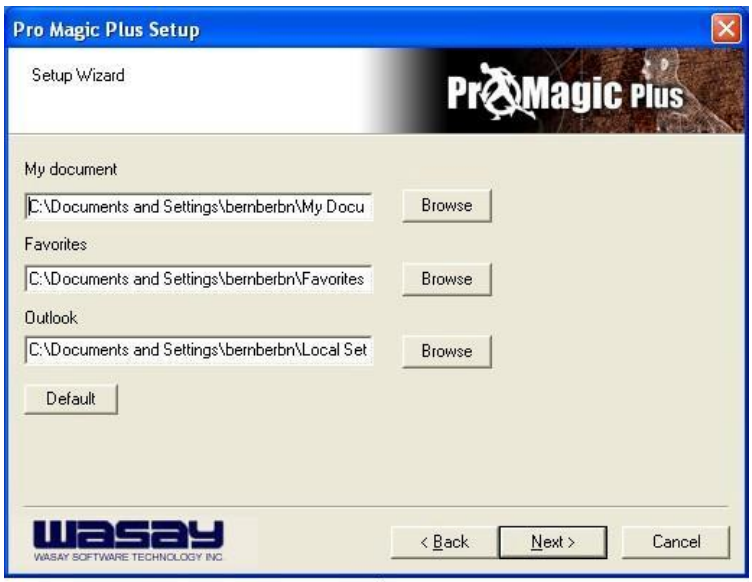
What's Pro Magic Plus?

Tired with reinstall OS each time when it doesn't work? Does your computer often crash down or unable to work after installed new software? Have you had great loses and troubles because of computer problems? Still using time-consuming backup software that occupies lots of HD space?

Pro Magic Plus- an instant system recovery software tailored to solve these problems for you. It combines various application tools (e.g. anti-virus, backup software, uninstall software, multi-boot software) to satisfy your needs of all sorts of system protections.

What functions does Pro Magic Plus have?

1. **Instant System Restoration** – Regardless of mis-operation or system crash, install Pro Magic Plus beforehand would allow you to instantly restore your system back by simply reboot your computer.
2. **Easy-to-use** – Auto installation from CD ROM; Supports Mouse
3. **System Uninstall** – Pro Magic provides a protection mode, which allows user to freely test any software. If user does not want to keep the software, just reboot the computer to restore back to the previous state, and Pro Magic will remove it completely from you computer.
4. **Password Security** – Pro Magic provides double password protection, including user password for entering each OS and manager password for managing 'Pro Magic', which can effectively prevent others from using your computer without permission or data from being stolen. (disable item for OEM version)
5. **Complete Protection** – Pro Magic not only protects the system disk, but also can protect your data disk, and does not require to reboot when backup or restore data disk.
6. **Multipoint Save/Restore** – You can backup your system whenever you need and restore them back to anytime you wish, 1 hour, 1 day or 1 month ago. Restore points are unlimited. (disable item for OEM version)
7. **Data Disk Protection** – Pro Magic Plus now comes with data disk protection, provides complete protection for your computer! (disable item for OEM version)
8. **You can choose to change the default path of 'My Document', 'My Favorite' and 'Outlook Express'**, so that when you are restoring the system, data in these folders will not be restored as well. (This is optional, you can leave it as it is).



graph 4

NOTE: Functions of each version will differ from each other, and will be based on the function descriptions of each version.

System Requirements

- ◇ First OS must be Windows XP/Vista/7
- ◇ Support Only Windows OS (No Linux)
- ◇ Windows server OS and Windows NT not supported
- ◇ Minimum of Intel 486 or above, 16MB of memory or above
- ◇ Minimum of 500MB free/usable space or above
- ◇ Support for SCSI & SATA Hard disk

Pro Magic Plus only supports SCSI hard disk with Windows XP or OS above

Notice Before Installation

1. Before install Pro Magic Plus, turn off all anti-virus software. (Include BIOS anti-virus function)
2. Pro Magic Plus does not support multiple PRI partitions. If you have multiple PRI partitions, please repartition your HD before installation.
3. If your HDD is not fully partitioned (with un-partitioned/unused space at end of HDD), please repartition the HDD before install Pro Magic Plus.

How to Update BIOS

Step 1. Prepare a bootable disk. (You may make one by click START click RUN type SYS A: click OK)

Step 2. Download upgrade tools and the latest BIOS files of the motherboard from official website and then make a copy of it to your bootable floppy disk after decompressing these files

Step 3. Insert the disk into A: ,start your computer and then type in "A:\xxxxxx.BAT"(xxxxxxx being the file name of the latest BIOS)

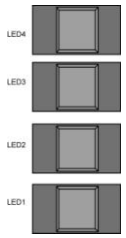
Step 4. Type Enter to update and flash the BIOS. The system will restart automatically when BIOS is upgraded.

Trouble Shooting

Problem	**Solution**
No power to the system to the all power light don't illuminate, fan inside power supply doesn't turn on.	1. Make sure power cable is security plugged in. 2. Replace cable. 3. Contact technical support.
System inoperative. Keyboard lights are on , power indicator lights are lit, and hard drive is spinning.	Using ever pressure on both ends of the DIMM , press down firmly until the module snaps into places.
System doesn't boot from hard disk drive, can be booted from optical drive.	1. Check cable running from disk to disk controller board. .Make sure both ends are securely plugged in, check the drive type in the standard CMOS setup. 2. Backing up the hard drive is extremely important .All hard disks are capable of breaking down at any time.
System only boots from optical drive .Hard disk can be read and applications can be used but booting from hard disk is impossible.	1. Back up date and applications files. 2. Reformat the hard drive. Reinstall applications and date using backup disks.
Screen message says "Invalid Configuration" or "CMOS Failure"	Review system 's equipment .Make sure correct information on is in setup.
Can not boot system after installing second hard drive.	1. Set master /slave jumpers correctly. 2. Run SETUP program and select correct drive types. Call the drive manufacture for compatibility with other drives.

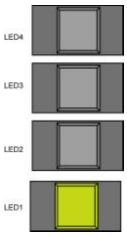
Appendix

LED Display Function



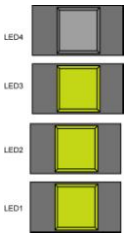
PWS_LED4
PWS_LED3
PWS_LED2
PWS_LED1

All LED off or glitter. It means the motherboard in the G.P.I mode. CPU works with the low power consumption.



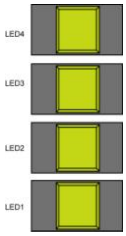
PWS_LED4
PWS_LED3
PWS_LED2
PWS_LED1

Three LED off or glitter. It means the motherboard is working on partial power saving mode. (The LED off indicate the relative power phase working with idle mode).



PWS LED4
PWS_LED3
PWS_LED2
PWS_LED1

Three LED on. It means the motherboard is working on partial power saving mode. (The LED off indicate the relative power phase working with idle mode)



PWS LED4
PWS_LED3
PWS_LED2
PWS_LED1

All LED on. It means the motherboard is working at full-speed with non- power saving mode. CPU is working on high-load state.

Regarding the Application of 3-Phase or 3+1 Phase Power Supply Mold

As a result of the increasing power consumption demand from many AMD CPUs in current market, we suggest not to use a CPU that demands more than 65W power consumption at work for an AMD CPU compliant board that comes with power supply design as 3 phase or 3+1 phase mold and MOSFET design as working in High SideX1 and Low SideX1 mold so as to avoid MOSFET getting burned or other phenomena like a halted system or system instability. So please take notice of the CPU you are using and make sure that it is one that demand not more than 65 W to ensure long-term working order.

Note：

1. The relation between CPU Power Consumption Amount and Power Phase: depending on difference in voltage rating, one-phase of power can provide 25~30W to the motherboard.
2. 3- Phase Power Supply Mold: motherboard with 3 inductances for CPU power supply, and each inductance carries with it 2 MOSFET (6 MOSFETs in total) (Figure1)
   3+1–Phase Power Supply Mold: motherboard with 4 inductances for CPU power supply, and each inductance carries with it 2 MOSFET (8 MOSFETs in total) (Figure2)

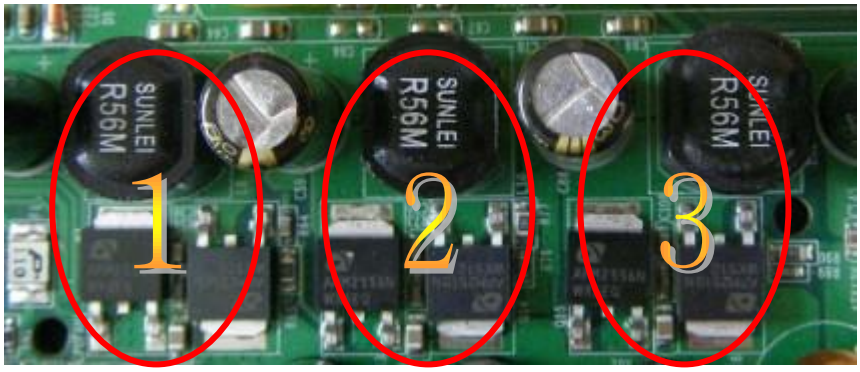


Figure 1

Figure 2

Solution：

We recommend users choose motherboards with power design of 4-phase, 4+1 phase or more for CPUs that demand 89W or 95W power consumption.

We recommend users choose motherboards with power design of 5-phase, 5+1 phase or more for CPUs that demand 125W or 140W power consumption.

Suggestion on choosing electric fan

Both the amount of electric current to MOSFET and the heat produced from the motherboard go up as AMD's CPU power consumption increases. In this case we recommend users select a CPU fan with air outlet towards MOSFET so that CPU fan can carry away heat produced by MOSFET, for better heat dissipation effects. At the same time we suggest using well-ventilated cases to maintain temperature as 38℃ approximately inside.(38℃ is recommended by CPU manufactures)

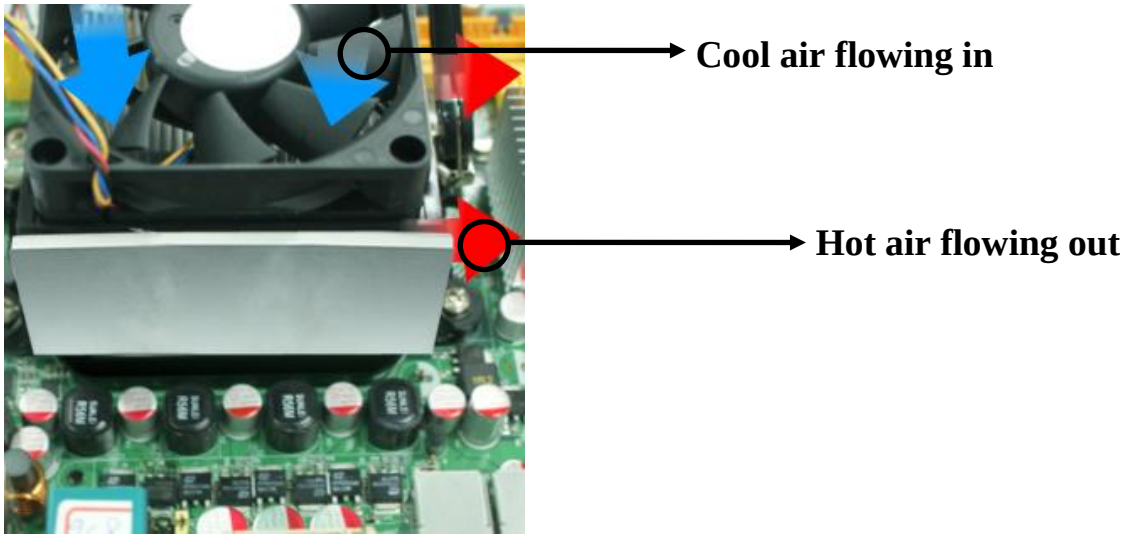


Figure 1---- CPU Fan can not blow off the heat produced by MOSFET. We suggest not to using fans of this kind

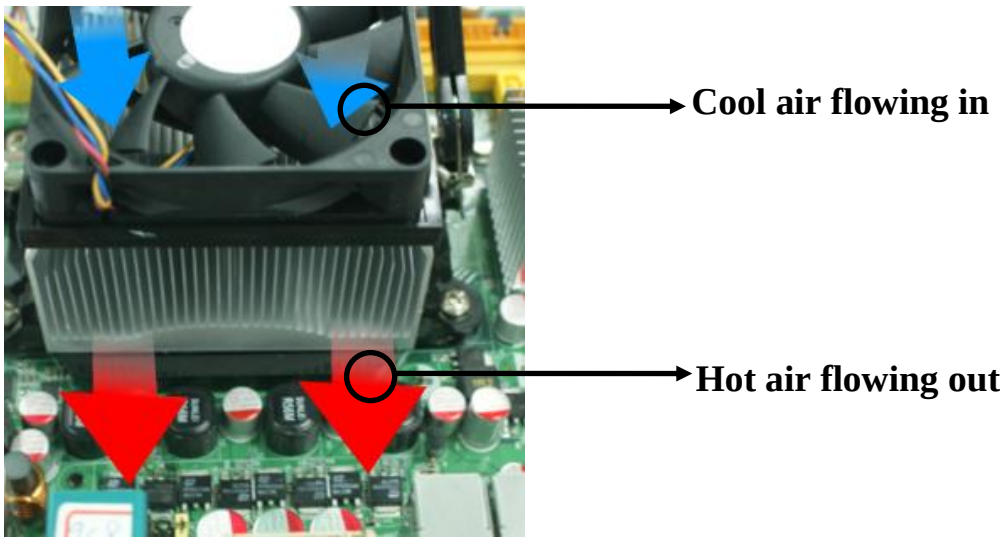


Figure 2---- CPU Fan can blow off the heat produced by MOSFET. We suggest using fans of this kind

Post BIOS Beep Code

Number of Beeps	Description
1	Memory refresh timer error.
2	Parity error in base memory (first 64KB block)
3	Base memory read/write test error
4	Motherboard timer not operational
5	Processor error
6	8042 Gate A20 test error (cannot switch to protected mode)
7	General exception error (processor exception interrupt error)
8	Display memory error (system video adapter)
9	AMIBIOS ROM checksum error
10	CMOS shutdown register read/write error
11	Cache memory test failed

Debug Port Post Code

Bootblock Initialization Code Checkpoints

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of checkpoints that may occur during the bootblock initialization portion of the BIOS[1]:

Checkpoint	Description
Before D0	If boot block debugger is enabled, CPU cache-as-RAM functionality is enabled at this point. Stack will be enabled from this point.
D0	Early Boot Strap Processor (BSP) initialization like microcode update, frequency and other CPU critical initialization. Early chipset initialization is done.
D1	Early super I/O initialization is done including RTC and keyboard controller. Serial port is enabled at this point if needed for debugging. NMI is disabled. Perform keyboard controller BAT test. Save power-on CPUID value in scratch CMOS. Go to flat mode with 4GB limit and GA20 enabled.
D2	Verify the boot block checksum. System will hang here if checksum is bad.
D3	Disable CACHE before memory detection. Execute full memory sizing module. If memory sizing module not executed, start memory refresh and do memory sizing in Boot block code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	given to it. BIOS now executes out of RAM. Copies compressed boot block code to memory in right segments. Copies BIOS from ROM to RAM for faster access. Performs main BIOS checksum and updates recovery status accordingly.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If BIOS recovery is necessary, control flows to checkpoint E0. See *Bootblock Recovery Code Checkpoints* section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine

	whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See *POST Code Checkpoints* section of document for more information.
DC	System is waking from ACPI S3 state
E1-E8 EC-EE	OEM memory detection/configuration error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.

Bootblock Recovery Code Checkpoints

The Bootblock recovery code gets control when the BIOS determines that a BIOS recovery needs to occur because the user has forced the update or the BIOS checksum is corrupt. The following table describes the type of checkpoints that may occur during the Bootblock recovery portion of the BIOS:

Checkpoint	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS preboot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and

	GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
07	Fixes CPU POST interface calling pointer.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache – Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
20	Relocate System Management Interrupt vector for all CPU in the system.
24	Uncompress and initialize any platform specific BIOS modules. GPNV is initialized at this checkpoint.
2A	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information. USB controllers are initialized at this point.

39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested. Check boot password if installed.
8C	Late POST initialization of chipset registers.
8D	Build ACPI tables (if ACPI is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Initialization of system management interrupt by invoking all handlers. *Please note this checkpoint comes right after checkpoint 20h*
A1	Clean-up work needed before booting to OS
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module. Display boot option popup menu.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector
AB	Prepare BBS for Int 19 boot. Init MP tables.
AC	End of POST initialization of chipset registers. De-initializes the ADM module.
B1	Save system context for ACPI. Prepare CPU for OS boot including final MTRR values.
00	Passes control to OS Loader (typically INT19h).

OEM POST Error Checkpoints

Checkpoints from the range 61h to 70h are reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.

DIM Code Checkpoints

The Device Initialization Manager (DIM) gets control at various times during BIOS

POST to initialize different system busses. The following table describes the main checkpoints where the DIM module is accessed[4]:

Checkpoint	Description
2A	Initialize different buses and perform the following functions: Reset, Detect, and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices, and PnP ISA cards. It also assigns PCI bus numbers. Function 1 initializes all static devices that include manual configured onboard peripherals, memory and I/O decode windows in PCIPCI bridges, and noncompliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI, or AGP video devices.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all onboard peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.

While control is in the different functions, additional checkpoints are output to port 80h as a word value to identify the routines under execution. The low byte value indicates the main POST Code Checkpoint. The high byte is divided into two nibbles and contains two fields. The details of the high byte of these checkpoints are as follows:

HIGH BYTE XY

The upper nibble 'X' indicates the function number that is being executed. 'X' can be from 0 to 7.

0 = func#0, disable all devices on the BUS concerned.
1 = func#1, static devices initialization on the BUS concerned.
2 = func#2, output device initialization on the BUS concerned.
3 = func#3, input device initialization on the BUS concerned.
4 = func#4, IPL device initialization on the BUS concerned.
5 = func#5, general device initialization on the BUS concerned.
6 = func#6, error reporting for the BUS concerned.
7 = func#7, add-on ROM initialization for all BUSes.
8 = func#8, BBS ROM initialization for all BUSes.

The lower nibble 'Y' indicates the BUS on which the different routines are being executed. 'Y' can be from 0 to 5.

0 = Generic DIM (Device Initialization Manager).
1 = On-board System devices.
2 = ISA devices.
3 = EISA devices.
4 = ISA PnP devices.
5 = PCI devices.

ACPI Runtime Checkpoints

ACPI checkpoints are displayed when an ACPI capable operating system either enters or leaves a sleep state. The following table describes the type of checkpoints that may occur during ACPI sleep or wake events:

Checkpoint	Description
AC	First ASL check point. Indicates the system is running in ACPI mode.
AA	System is running in APIC mode.
01,02,03,04,05	Entering sleep state S1, S2, S3, S4, or S5.
10,20,30,40,50	Waking from sleep state S1, S2, S3, S4, or S5.

* The above list is for reference use only.

Glossary

Chipset (or core logic) - two or more integrated circuits which control the interfaces between the system processor, RAM, I/O devises, and adapter cards.
Processor socket - the socket used to mount the system processor on the motherboard.
Slot (PCI-E, PCI, RAM) - the slots used to mount adapter cards and system RAM.
PCI - **P**eripheral **C**omponent **I**nterconnect - a high speed interface for video cards, sound cards, network interface cards, and modems; runs at 33MHz.
PCI Express2.0- Peripheral Component Interconnect Express2.0, developed in 2003, the speed of each line doubled from the previous PCI-E of 2.5 Gbps to 5 Gbps.
Serial Port - a low speed interface typically used for mouse and external modems.
Parallel Port - a low speed interface typically used for printers.
PS/2 - a low speed interface used for mouse and keyboards.
USB - **U**niversal **S**erial **B**us - a medium speed interface typically used for mouse, keyboards, scanners, and some digital cameras.
Sound (interface) - the interface between the sound card or integrated sound connectors and speakers, MIC, game controllers, and MIDI sound devices.
LAN (interface) - **L**ocal **A**rea **N**etwork - the interface to your local area network.
BIOS (**B**asic **I**nput/**O**utput **S**ystem) - the program logic used to boot up a computer and establish the relationship between the various components.
Driver - software, which defines the characteristics of a device for use by another device or other software.
Processor - the "central processing unit" (CPU); the principal integrated circuit used for doing the "computing" in "personal computer"
Front Side Bus Frequency - the working frequency of the motherboard, which is generated by the clock generator for CPU, DRAM and PCI BUS.
CPU L2 Cache - the flash memory inside the CPU, normal it depend on CPU type.

Performance List

The following performance data list is the testing result of some popular benchmark testing programs. These data are just referred by users, and there is no responsibility for different testing data values gotten by users (the different Hardware & Software configuration will result in different benchmark testing results.)

Performance Test Report

CPU: D605EHDK42GM
DRAM: KINGSTON 1333 2G*2
VGA Card: onboard
Hard Disk Driver: MAXTOR 250G
BIOS: V01
OS: Windows XP Professional (SERVICE PACK 3)

3D Mark 2006		2834
3D Mark 2005		4628
AQUAMRK3		49275
PCMark2005		
System / CPU / Memory		6408/8528/5292
Graph / HDD		2952/5598
Winbench 99 V2.0:		
Business/Hi-end Disk Winmark99		30300 2.3
SySMark 2004: SISMark Rating(Internet Content Creation / Office Productivity)		
SySMark 2004		353
3D Creation / 2D Creation		210/548
/ Web publication		383
Communication / Document Creation		133/304
/ Data Analysis		284
SiSOFT Sandra 2005 : 1.CPU Arithmetic Benchmark 2.Memory bandwidth Benchmark 3.CPU Multi-Media Benchmark		
1.Dhrystone ALU	MIPS	37.93GIPS
Whetstone FPU iSSE2	FLOPS	36.70GIPS
2.Int/Float Buffered iSSE2	MB/S	11.79GB/S 11.81GB/S
3.Integer/Floating-Point SSE2	MPIXEL/S	47.85 /26.16
UT2003 Benchmark (flyby/botmatch)		301.803772/113.810760
Super Pi (1M)	Second	28.078S
CPUZ System / CPU Clock		2800MHZ/200*14